ZETA 2002

38 - 266 kW

Manual 101010B02
Issue 11.02
Replaces 04.02

Installation, operating, and maintenance manual

CE
0062

Water chillers

Air/water self-contained

Axial fans and scroll compressors

BLUE BOX
condizionamento

ISO 9001 - Cert. n. 0201

CONTENTS Page

ZETA 2002 - water chiller

Air-cooled liquid chillers with hermetic scroll compressors and plate type evaporator, suitable for outdoor installations. The unit has a refrigerant circuit for each pair of compressors.

UNIT FRAME

Self supporting frame with removable panels, internally coated with expanded polyurethane sound-absorbing material; constructed from galvanized sheet steel with RAL 5014 powder paint baked at 180°C to provide a durable weatherproof finish. Threaded fasteners in stainless steel.

COMPRESSORS

Hermetic scroll type with orbital motion, connected in tandem and equipped with oil level sight glass, Klixon internal thermal protection and oil equalisation line.
The compressors are housed in a sound insulated compartment and separated from the air flow; access is provided by removable panels which allow maintenance work to be performed in safety even when the unit is in operation.

CONDENSER

Composed of a high efficiency coil manufactured from copper tubes and aluminium fins.
The finned coil is protected by a metal grille which is installed as standard.

CONDENSER FANS

Axial fans directly coupled to 6 pole motors with internal Klixon overload protection.
Motor protection category is IP 54. The fan is equipped with a safety grille to UNI EN 294.

EVAPORATOR

Brazed plate type in 316 AISI stainless steel. Thermal insulation of evaporator is provided by closed cell expanded material. Each evaporator is equipped with a low water temperature probe for freeze protection and each unit is equipped as standard with a mechanical flow switch.

REFRIGERANT CIRCUIT

Comprising: liquid valve, charge connection, liquid sight-glass, filter/dryer, thermostatic expansion valve with external pressure equalisation, high and low pressure switches for 2-compressor models.
For 4-compressor models high and low pressure values and relative condensation and evaporation temperatures are measured by pressure transducers that relay the signals to the controller so that they can be read directly on the display. The high pressure side of the circuit is equipped with high pressure switches and relief valves.

ELECTRICAL PANEL

The electrical panel includes:

- main switch
- thermal magnetic circuit-breakers for fans and (if present) pumps; compressor fuses for the power circuit
- compressor contactors
- fan contactors
- pump contactors (ST version)

The microprocessor controls the following functions on all units:

- water temperature regulation
- freeze protection
- compressor time intervals
- compressor start sequence and automatic lead/lag selection
- alarm reset
- common alarm contact for remote signalling
- operating and alarm indicator LEDs

LCD display of the following information:
- water inlet and outlet temperature
- programmed temperature set-point and differential
- alarms description
- compressor hours run meter

for 4 compressor units:
- number of starts of the unit and the compressors
- high and low pressure values and relative condensation and evaporation temperature values.

Electrical power supply [V/f/Hz]: 400/3~/50 ±5%

CONTROLS AND SAFETY DEVICES
- chilled water temperature probe (at evaporator inlet)
- freeze protection probe at the outlet of each evaporator
- safety high pressure switch with manual reset
- low pressure switch (with manual reset controlled by the control)
- high pressure relief valve
- compressor over-temperature protection
- fan over-temperature protection
- mechanical flow switch, supplied as standard on all units, as kit for units 3.2 to 13.2 and factory installed for units 14.4 to 26.4.

TESTING
The units are subjected to a dry run in the factory and supplied complete with oil and refrigerant.

ZETA UNIT VERSIONS

ZETA 2002 /HP: reverse cycle heat pump
The heat pump version operates as a air cooled chiller in summer and a air to water heat pump in winter by reversing the refrigerant flow to suit the required operating mode.
- Refrigerant circuit:
  4-way reversing valve, liquid receiver, second thermostatic valve.
- Electrical panel:
  Microprocessor enabled for summer/winter changeover and automatic defrosting.

ZETA 2002 LE: condensing unit.
The basic ZETA 2002 model is not equipped with an evaporator or thermostatic valve.
Also the four compressor models are not supplied with a microprocessor controller. Liquid receivers can be supplied as an accessory. The solenoid valve on the liquid line is supplied as standard.

ZETA 2002 LE /HP: heat pump condensing unit.
The basic ZETA 2002/HP model is not equipped with an evaporator, a thermostatic valve and four compressor models are not supplied with a microprocessor controller. Liquid receivers can be supplied as an accessory. The solenoid valve on the liquid line is supplied as standard.

HYDRAULIC MODULE OPTIONS

ZETA 2002 /ST 2PS : unit with storage tank and pumps.
In addition to the components of version ZETA 2002, this unit includes:
insulated storage tank; run and standby circulating pumps, with automatic changeover for four compressor models and manual changeover for two compressor models;
Also provided are an expansion tank, check valves and gate valves.

Version ST is available in the following additional four configurations:
- ST 1PS : with 1 pump and tank;
- ST 2P : with 2 pumps and no tank;
- ST S : with tank and no pumps;
- ST 1P : with 1 pump and no tank.

ACCESSORY VERSIONS

ZETA 2002 /DC: unit with heat recovery condenser.
Not available for HP versions.
This accessory is available for the following models: 3.2-13.2 "1p-2p" 18.4-26.4"s".
In addition to the components of version ZETA 2002, this unit includes a 100% heat recovery condenser for the production of hot water, a recovery water temperature control thermostat, and a recovery circuit safety pressure switch.

ZETA 2002 /DS: unit with desuperheaters
The brazed plate type desuperheater is arranged in series with the condensing coil. It is available for the following models: from 3.2 to 13.2 with "1p-2p" and from 14.4 to 26.4 "1p-2p-1ps-2ps-s".
It is also available in the HP configuration. In this case the installation must be fitted with a shut-off valve on the water recovery circuit, to be closed during heat pump mode operation as described in the manual.

ZETA 2002 /LN: low noise unit
In addition to the components of version ZETA 2002, this unit includes:
galvanised sheet steel compressor compartment with full sound insulation using expanded polyurethane sound absorption material and expanded polyurethane with an intermediate layer of high acoustic impedance material applied to the sides of the compartment.

ZETA 2002 /SLN: extra low noise unit
In addition to the components of version LN, this unit is designed to operate with a slower fan speed to further reduce noise levels.

REFRIGERANT CIRCUIT ACCESSORIES:

- Step type condensing pressure control
  (ambient air minimum temperature 0 °C).
  The control is managed in On/Off mode by the microprocessor by means of the pressure transducers.
  Available for models 18.4 to 26.4 only.

- Condensing pressure control by fan speed regulator
  (ambient air minimum temperature -20 °C).
  Fan speed is regulated in accordance with the condensation pressure read by the pressure transducers.
  Available for all models.

- Dual set-point.
  With double thermostatic valves + solenoid valves. In units with two compressors the set-point must be modified manually on the controller. For four compressor units two set-points can be programmed and switched between them from the keypad or using a digital input. The type of selection must be specified at the time of the order. In all cases the thermostatic valves switch automatically on the basis of the water temperature.

- Pressure gauges.
  Available for all models. Note however that on 4-compressor units the suction and discharge pressure values are read by transducers that relay the results to the controller display.

- Liquid receivers
  (standard on versions /HP and /HP/LE)

- Compressor suction and discharge valves

- Liquid line solenoid valve
  .

HYDRAULIC CIRCUIT ACCESSORIES

- Leaving water temperature control.
  Available only on 4-compressor models (not HP versions).

- Anti-freeze heater

- Water side relief valve (version ST only).
  The value is set at 6 bar, corresponding to the maximum permissible working pressure.

ELECTRICAL ACCESSORIES

- Serial interface:
  - 2-compressor units are equipped with RS485 type serial interface with Carel protocol.
  - 4-compressor units are equipped with RS485 type serial interface with Modbus protocol; the following optional protocols are available on request: Carel; Echelon in version RS485 or in version FTT10

- Power factor correction cos f ³ 0.9 at nominal operating conditions

- Single voltage-free contacts for machine status signals

- Set-point variable in a range of 3 °C with remote signal (0-1V, 0-10V, 0-4mA, 0-20mA).
  Available only for models from 16.4 to 26.4

- Remote user terminal panel (in addition to the standard terminal)

VARIOUS ACCESSORIES

- Rubber anti-vibration mountings.
  Available for all models in the series

- Spring type anti-vibration mounts.
  Available for models 18.4 to 26.4

- Timber crate packing

- Pallet/skid for container shipment

- Mesh coil guard with metallic filter.
  Standard equipment on models from 14.4 to 26.4.

- Anti-corrosion treatment of coils for use in aggressive environments

- Non-standard RAL paint colours

SERIES

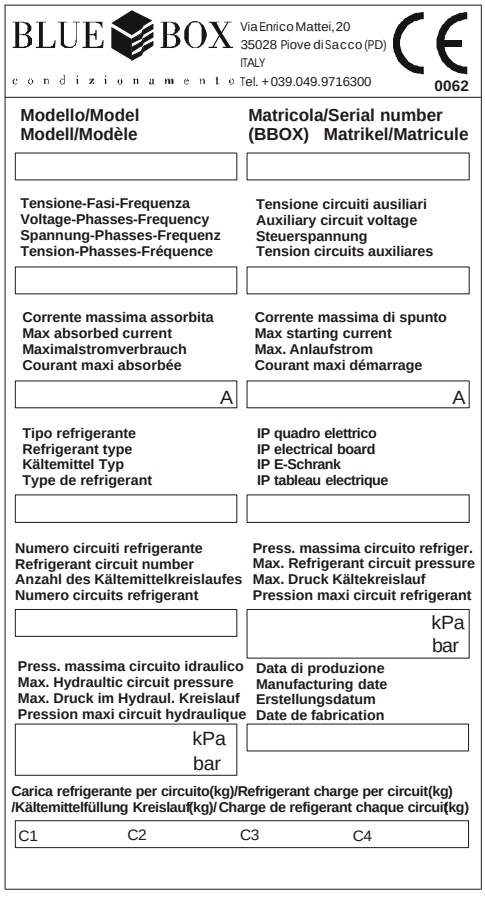
The ZETA 2002 series of water cooled chillers and heat pumps, are available in various sizes with capacities from 38 to 266 kW.

Model designations consist of two numbers:

ZETA 2002 14.4

Shows the model — number of compressors

The model, serial number, characteristics, power supply, etc. are shown by means of decals on the unit.


BLUE BOX condizionamento
Via Enrico Mattei, 20
35028 Piove di Sacco (PD)
ITALY
Tel. +039.049.9716300
CE 0062

Modello/Model
Modell/Modèle

Matricola/Serial number
(BBOX) Matrikel/Matricule

Tensione-Fasi-Frequenza
Voltage-Phasses-Frequency
Spannung-Phasses-Frequenz
Tension-Phasses-Fréquence

Tensione circuiti ausiliari
Auxiliary circuit voltage
Steuerspannung
Tension circuits auxiliares

Corrente massima assorbita
Max absorbed current
Maximalstromverbrauch
Courant maxi absorbée

A

Corrente massima di spunto
Max starting current
Max. Anlaufstrom
Courant maxi démarrage

A

Tipo refrigerante
Refrigerant type
Kältemittel Typ
Type de refrigerant

IP quadro elettrico
IP electrical board
IP E-Schrank
IP tableau electrique

Numero circuiti refrigerante
Refrigerant circuit number
Anzahl des Kältemittelkreislaufes
Numero circuits refrigerant

Press. massima circuito refriger.
Max. Refrigerant circuit pressure
Max. Druck Kältekreislauf
Pression maxi circuit refrigerant

kPa
bar

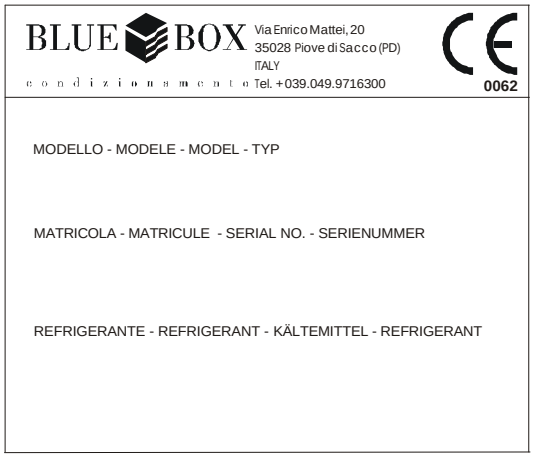
Press. massima circuito idraulico
Max. Hydraultic circuit pressure
Max. Druck im Hydraul. Kreislauf
Pression maxi circuit hydraulique

kPa
bar

Data di produzione
Manufacturing date
Erstellungsdatum
Date de fabrication

Carica refrigerante per circuito(kg)/Refrigerant charge per circuit(kg)/Kältemittelfüllung Kreislauf(kg)/ Charge de refigerant chaque circuit(kg)

C1 C2 C3 C4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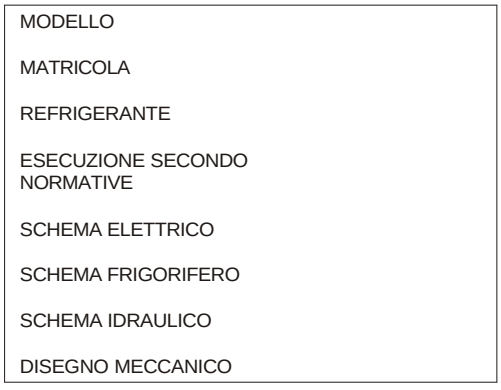
MODELLO - MODELE - MODEL - TYP

MATRICOLA - MATRICULE - SERIAL NO. - SERIENUMMER

REFRIGERANTE - REFRIGERANT - KÄLTEMITTEL - REFRIGERANT


MODELLO

MATRICOLA

REFRIGERANTE

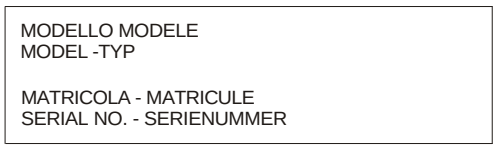
ESECUZIONE SECONDO NORMATIVE

SCHEMA ELETTRICO

SCHEMA FRIGORIFERO

SCHEMA IDRAULICO

DISEGNO MECCANICO


MODELLO MODELE
MODEL -TYP

MATRICOLA - MATRICULE
SERIAL NO. - SERIENUMMER

TECHNICAL DATA

R22 refrigerant

MODEL ZETA 2002		3.2	4.2	5.2	6.2
Cooling (*)					
Nominal capacity	kW	38,4	47,1	52,9	61,6
Evaporator water flow	l/s	1,835	2,251	2,528	2,943
	l/h	6.607	8.105	9.102	10.596
Evaporator pressure drop	kPa	59,1	59,2	46,9	51,5
Heating (**)					
Nominal capacity	kW	38,4	46,9	53,2	60,8
Condenser water flow	l/s	1,833	2,239	2,540	2,907
	l/h	6.600	8.061	9.146	10.466
Condenser pressure drop	kPa	59	58,6	47,3	50,3
Compressors	type	scroll			
Quantity	n	2	2	2	2
Refrigerant circuits	n	1	1	1	1
Absorbed power cooling (*)	kW	12	14,3	16,5	18,7
Absorbed power heating (**)	kW	12,8	15,4	16,9	19,5
Capacity steps	%	0/50/100	0/50/100	0/50/100	0/50/100
Condenser cooling fans	type	axial			
Total air flow	m^3/s	4,472	4,472	4,472	4,528
	m^3/h	16.100	16.100	16.100	16.300
Fan motor power	n x kW	2 x 0,6	2 x 0,6	2 x 0,6	2 x 0,6
Nominal revolution speed	RPM	860			
Electric motor supply	V/Ph/Hz	230/~/50			
Refrigerant charge					
Chiller version	kg	1 x 14,5	1 x 14,5	1 x 14,5	1 x 19,5
Heat pump version	kg	1 x 15	1 x 15	1 x 15	1 x 22
Oil					
Oil charge	l	2 x 3,3	2 x 3,3	2 x 3,8	1 x 4 + 1 x 3,8
Oil producer		Maneurop			
Oil type		160 P			
Evaporator	type	plate			
Heat exchanger water volume	l	4,6	5,7	7,4	8,4
Max operating pressure water side	bar	30			
Dimension and weight					
Length	mm	2.233	2.233	2.233	2.233
Width	mm	1.043	1.043	1.043	1.043
Heigth	mm	1.740	1.740	1.740	1.740
Shipping weight	kg	594	604	625	672

(*) ambient air temperature 35°C; evaporator entering/leaving water temperature 12-7 °C;.
(**) ambient air temperature 8°C DB, 70%RH; condenser entering/leaving water temperature 40-45 °C.

TECHNICAL DATA

R22 refrigerant

MODEL ZETA 2002		7.2	8.2	9.2	10.2
Cooling (*)					
Nominal capacity	kW	68,9	78,9	93,4	105,4
Evaporator water flow	l/s	3,292	3,771	4,460	5,034
	l/h	11.852	13.577	16.057	18.121
Evaporator pressure drop	kPa	43,8	45,2	47,9	45,6
Heating (**)					
Nominal capacity	kW	68,5	79,7	92,6	105,6
Condenser water flow	l/s	3,274	3,807	4,425	5,044
	l/h	11.787	13.704	15.931	18.158
Condenser pressure drop	kPa	43,3	46	47,2	45,8
Compressors	type	scroll			
Quantity	n	2	2	2	2
Refrigerant circuits	n	1	1	1	1
Absorbed power cooling (*)	kW	21,7	25	29,7	35,7
Absorbed power heating (**)	kW	22,1	25,5	29,8	34,1
Capacity steps	%	0/50/100	0/50/100	0/50/100	0/50/100
Condenser cooling fans	type	axial			
Total air flow	m^3/s	4,528	4,389	6,833	6,833
	m^3/h	16.300	15.800	24.600	24.600
Fan motor power	n x kW	2 x 0,6	2 x 0,6	3 x 0,6	3 x 0,6
Nominal revolution speed	RPM	860			
Electric motor supply	V/Ph/Hz	230/~/50			
Refrigerant charge					
Chiller version	kg	1 x 19,5	1 x 22	1 x 27,5	1 x 27,5
Heat pump version	kg	1 x 22	1 x 27	1 x 32	1 x 32
Oil					
Oil charge	l	2 x 4	2 x 6,6	1 x 8 + 1 x 6,6	2 x 8
Oil producer		Maneurop			
Oil type		160 P		320 SZ	
Evaporator	type	plate			
Heat exchanger water volume	l	4,2	4,8	6,3	7,3
Max operating pressure water side	bar	30			
Dimension and weight					
Length	mm	2.233	2.233	3.234	3.234
Width	mm	1.043	1.043	1.144	1.144
Heigth	mm	1.740	1.740	1.740	1.740
Shipping weight	kg	690	737	981	1.058

(*) ambient air temperature 35°C; evaporator entering/leaving water temperature 12-7 °C;.
(**) ambient air temperature 8°C DB, 70%RH; condenser entering/leaving water temperature 40-45 °C.

TECHNICAL DATA

R22 refrigerant

MODEL ZETA 2002		12.2	13.2	14.4	16.4
Cooling (*)					
Nominal capacity	kW	120,4	130,3	139,4	159,6
Evaporator water flow	l/s	5,754	6,225	6,659	7,626
	l/h	20.715	22.409	23.974	27.453
Evaporator pressure drop	kPa	50,9	44	51,6	55,1
Heating (**)					
Nominal capacity	kW	118,4	131,2	137,1	159,4
Condenser water flow	l/s	5,656	6,268	6,548	7,614
	l/h	20.362	22.566	23.573	27.409
Condenser pressure drop	kPa	49,2	44,6	50	55
Compressors	type	scroll			
Quantity	n	2	2	4	4
Refrigerant circuits	n	1	1	2	2
Absorbed power cooling (*)	kW	38,1	43,6	42,6	49
Absorbed power heating (**)	kW	37,7	41,3	44,1	51
Capacity steps	%	0/50/100	0/50/100	0/25/50/75/100	0/25/50/75/100
Condenser cooling fans	type	axial			
Total air flow	m^3/s	6,600	6,583	11,267	11,267
	m^3/h	23.760	23.700	40.560	40.560
Fan motor power	n x kW	3 x 0,6	3 x 0,6	2 x 2,0	2 x 2,0
Nominal revolution speed	RPM	860			
Electric motor supply	V/Ph/Hz	230/~/50		400/3~/50	
Refrigerant charge					
Chiller version	kg	1 x 32	1 x 32	2 x 19,5	2 x 21
Heat pump version	kg	1 x 36	1 x 36	2 x 22	2 x 23
Oil					
Oil charge	l	2 x 8	2 x 8	4 x 4	4 x 6,6
Oil producer		Maneurop			
Oil type		320 SZ		160 P	
Evaporator	type	plate			
Heat exchanger water volume	l	8,4	9,4	5,2	4,8
Max operating pressure water side	bar	30			
Dimension and weight					
Length	mm	3.234	3.234	3.234	3.234
Width	mm	1.144	1.144	1.119	1.119
Heigth	mm	1.740	1.740	2.380	2.380
Shipping weight	kg	1.124	1.158	1.400	1.464

(*) ambient air temperature 35°C; evaporator entering/leaving water temperature 12-7 °C;.
(**) ambient air temperature 8°C DB, 70%RH; condenser entering/leaving water temperature 40-45 °C.

TECHNICAL DATA

R22 refrigerant

MODEL ZETA 2002		18.4	20.4	24.4	26.4
Cooling (*)					
Nominal capacity	kW	188,8	215,5	240,9	266,2
Evaporator water flow	l/s	9,019	10,298	11,508	12,718
	l/h	32.469	37.073	41.430	45.786
Evaporator pressure drop	kPa	61,6	64	71,4	70,9
Heating (**)					
Nominal capacity	kW	185,2	211,1	236,8	262,4
Condenser water flow	l/s	8,851	10,088	11,312	12,536
	l/h	31.863	36.316	40.724	45.131
Condenser pressure drop	kPa	59,4	61,6	69,1	68,9
Compressors	type	scroll			
Quantity	n	4	4	4	4
Refrigerant circuits	n	2	2	2	2
Absorbed power cooling (*)	kW	58,2	68,7	76,3	83,9
Absorbed power heating (**)	kW	59,6	68,2	75,4	82,7
Capacity steps	%	0/25/50/75/100	0/25/50/75/100	0/25/50/75/100	0/25/50/75/100
Condenser cooling fans	type	axial			
Total air flow	m^3/s	16,375	16,417	19,389	18,500
	m^3/h	58.950	59.100	69.800	66.600
Fan motor power	n x kW	3 x 2,0	3 x 2,0	4 x 2,0	4 x 2,0
Nominal revolution speed	RPM	880			
Electric motor supply	V/Ph/Hz	400/3~/50			
Refrigerant charge					
Chiller version	kg	2 x 27	2 x 27	2 x 26	2 x 31,5
Heat pump version	kg	2 x 30	2 x 30	2 x 30	2 x 35
Oil					
Oil charge	l	2 x 8 + 2 x 6,6	4 x 8	4 x 8	4 x 8
Oil producer		Maneurop			
Oil type		320 SZ			
Evaporator	type	plate			
Heat exchanger water volume	l	6,3	7,3	8,4	9,4
Max operating pressure water side	bar	30			
Dimension and weight					
Length	mm	4.234	4.234	4.234	4.234
Width	mm	1.119	1.119	1.119	1.119
Heigth	mm	2.380	2.380	2.380	2.380
Shipping weight	kg	1.930	2.089	2.208	2.349

(*) ambient air temperature 35°C; evaporator entering/leaving water temperature 12-7 °C;.
(**) ambient air temperature 8°C DB, 70%RH; condenser entering/leaving water temperature 40-45 °C.

TECHNICAL DATA - ELECTRICAL CHARACTERISTICS AND COMPONENTS

R22 refrigerant

MODEL ZETA 2002		3.2	4.2	5.2	6.2
Maximum absorbed power (1)	kW	17,6	19,6	24	27
	kW	(18,1)	(20,1)	(24,5)	(28,1)
Maximum starting current	A	120,4	155,4	150,4	205,4
	A	(122,1)	(157,1)	(152,1)	(208,3)
Full load current (2)	A	39,4	45,4	55,4	65,4
	A	(41,1)	(47,1)	(57,1)	(68,3)
Fan motor nominal power	n x kW	2 x 0,6	2 x 0,6	2 x 0,6	2 x 0,6
Fan motor nominal absorbed current	n x A	2 x 2,7	2 x 2,7	2 x 2,7	2 x 2,7
Pump motor nominal power	kW	(1 x 0,5)	(1 x 0,5)	(1 x 0,5)	(1 x 1,1)
Pump motor nominal absorbed power	A	(1 x 1,7)	(1 x 1,7)	(1 x 1,7)	(1 x 2,9)
Power supply	V/Ph/Hz	400V 3N ~ 50Hz ±5% V			
Control power supply	V/Ph/Hz	230V/ ~/50Hz			
Control circuit supply	V/Ph/Hz	24V/~/50Hz			
Condenser fans supply	V/Ph/Hz	230V/ ~/50Hz			
Pump supply, ST groups	V/Ph/Hz	400V/3~/50			

MODEL ZETA 2002		7.2	8.2	9.2	10.2
Maximum absorbed power (1)	kW	30	35,2	41,7	47,6
	kW	(31,1)	(36,3)	(43,2)	(49,1)
Maximum starting current	A	215,4	215,4	258,1	273,1
	A	(218,3)	(218,3)	(262,4)	(277,4)
Full load current (2)	A	75,4	75,4	93,1	108,1
	A	(78,3)	(78,3)	(97,4)	(112,4)
Fan motor nominal power	n x kW	2 x 0,6	2 x 0,6	3 x 0,6	3 x 0,6
Fan motor nominal absorbed current	n x A	2 x 2,7	2 x 2,7	3 x 2,7	3 x 2,7
Pump motor nominal power	kW	(1 x 1,1)	(1 x 1,1)	(1 x 1,5)	(1 x 1,5)
Pump motor nominal absorbed power	A	(1 x 2,9)	(1 x 2,9)	(1 x 4,3)	(1 x 4,3)
Power supply	V/Ph/Hz	400V 3N ~ 50Hz ±5% V			
Control power supply	V/Ph/Hz	230V/ ~/50Hz			
Control circuit supply	V/Ph/Hz	24V/~/50Hz			
Condenser fans supply	V/Ph/Hz	230V/ ~/50Hz			
Pump supply, ST groups	V/Ph/Hz	400V/3~/50			

(1) mains power supply to allow unit operation.
(2) maximum current before safety cut-outs stop the unit. This value is never exceeded and must be used to size the electrical supply cables and relevant safety devices (refer to electrical wiring diagram supplied with the unit).

All values in brackets are refer to /ST version (units with storage tank) or units with pump.

TECHNICAL DATA - ELECTRICAL CHARACTERISTICS AND COMPONENTS

R22 refrigerant

MODEL ZETA 2002		12.2	13.2	14.4	16.4
Maximum absorbed power (1)	kW	52,4	57,2	61,6	72
	kW	(54,6)	(59,4)	(63,8)	(74,2)
Maximum starting current	A	328,1	347,1	288	288
	A	(333,4)	(352,4)	(293,3)	(293,3)
Full load current (2)	A	127,1	146,1	148	148
	A	(132,4)	(151,4)	(153,3)	(153,3)
Fan motor nominal power	n x kW	3 x 0,6	3 x 0,6	2 x 2,0	2 x 2,0
Fan motor nominal absorbed current	n x A	3 x 2,7	3 x 2,7	2 x 4,0	2 x 4,0
Pump motor nominal power	kW	(1 x 2,2)	(1 x 2,2)	(1 x 2,2)	(1 x 2,2)
Pump motor nominal absorbed power	A	(1 x 5,3)	(1 x 5,3)	(1 x 5,3)	(1 x 5,3)
Power supply	V/Ph/Hz	400V 3N ~ 50Hz ±5% V			
Control power supply	V/Ph/Hz	230V/ ~/50Hz			
Control circuit supply	V/Ph/Hz	24V/~/50Hz			
Condenser fans supply	V/Ph/Hz	230V/ ~/50Hz		400V/3~/50	
Pump supply, ST groups	V/Ph/Hz	400V/3~/50			

MODEL ZETA 2002		18.4	20.4	24.4	26.4
Maximum absorbed power (1)	kW	85,8	97,6	109,2	118,8
	kW	(89,8)	(101,6)	(113,2	(124,3)
Maximum starting current	A	347	377	455	493
	A	(356,5)	(386,5)	(464,5)	(505)
Full load current (2)	A	182	212	254	292
	A	(191,5)	(221,5)	(263,5)	(304)
Fan motor nominal power	n x kW	3 x 2,0	3 x 2,0	4 x 2,0	4 x 2,0
Fan motor nominal absorbed current	n x A	3 x 4,0	3 x 4,0	4 x 4,0	4 x 4,0
Pump motor nominal power	kW	(1 x 4,0)	(1 x 4,0)	(1 x 4,0)	(1 x 5,5)
Pump motor nominal absorbed power	A	(1 x 9,5)	(1 x 9,5)	(1 x 9,5)	(1 x 12,0)
Power supply	V/Ph/Hz	400V 3N ~ 50Hz ±5% V			
Control power supply	V/Ph/Hz	230/~/50			
Control circuit supply	V/Ph/Hz	24V ~ 50Hz			
Condenser fans supply	V/Ph/Hz	400V/3~/50			
Pump supply, ST groups	V/Ph/Hz	400V/3~/50			

(1) mains power supply to allow unit operation.
(2) maximum current before safety cut-outs stop the unit. This value is never exceeded and must be used to size the electrical supply cables and relevant safety devices (refer to electrical wiring diagram supplied with the unit).

All values in brackets are refer to /ST version (units with storage tank) or units with pump.

TECHNICAL DATA - ZETA 2002 /ST 2PS

R22 refrigerant

MODEL ZETA 2002		3.2	4.2	5.2	6.2
Pump section					
Evaporator water flow	l/s	1,84	2,25	2,53	2,94
	l/h	6.607	8.105	9.102	10.596
Pump nominal power	kW	0,5	0,5	0,5	1,1
External available pressure	kPa	114	95	93	139
Storage tank water volume	l	200	200	200	200
Dimension and weight					
Length	mm	2.233	2.233	2.233	2.233
Width	mm	1.043	1.043	1.043	1.043
Heigth	mm	1.740	1.740	1.740	1.740
Shipping weight	kg	724	734	755	807

MODEL ZETA 2002		7.2	8.2	9.2	10.2
Pump section					
Evaporator water flow	l/s	3,29	3,77	4,46	5,03
	l/h	11.852	13.577	16.057	18.121
Pump nominal power	kW	1,1	1,1	1,5	1,5
External available pressure	kPa	134	113	122	107
Storage tank water volume	l	200	200	450	450
Dimension and weight					
Length	mm	2.233	2.233	3.234	3.234
Width	mm	1.043	1.043	1.144	1.144
Heigth	mm	1.740	1.740	1.740	1.740
Shipping weight	kg	825	868	1.142	1.219

MODEL ZETA 2002		12.2	13.2	14.4	16.4
Pump section					
Evaporator water flow	l/s	5,75	6,23	6,66	7,63
	l/h	20.715	22.409	23.974	27.453
Pump nominal power	kW	2,2	2,2	2,2	2,2
External available pressure	kPa	114	108	134	98
Storage tank water volume	l	450	450	340	340
Dimension and weight					
Length	mm	3.234	3.234	3.234	3.234
Width	mm	1.144	1.144	1.119	1.119
Heigth	mm	1.740	1.740	2.380	2.380
Shipping weight	kg	1.275	1.309	1.642	1.678

MODEL ZETA 2002		18.4	20.4	24.4	26.4
Pump section					
Evaporator water flow	l/s	9,02	10,30	11,51	12,72
	l/h	32.469	37.073	41.430	45.786
Pump nominal power	kW	4	4	4	5,5
External available pressure	kPa	139	123	100	159
Storage tank water volume	l	700	700	700	700
Dimension and weight					
Length	mm	5.234	5.234	5.234	5.234
Width	mm	1.119	1.119	1.119	1.119
Heigth	mm	2.380	2.380	2.380	2.380
Shipping weight	kg	2.290	2.449	2.622	2.749

TECHNICAL DATA

R407C refrigerant

MODEL ZETA 2002		3.2	4.2	5.2	6.2
Cooling (*)					
Nominal capacity	kW	37,1	44,7	51,4	60,3
Evaporator water flow	l/s	1,77	2,13	2,45	2,88
	l/h	6.377	7.682	8.833	10.379
Evaporator pressure drop	kPa	57,2	55,4	45,9	51,4
Heating (**)					
Nominal capacity	kW	36,4	44,8	51,9	60
Condenser water flow	l/s	1,74	2,14	2,48	2,87
	l/h	6.267	7.698	8.923	10.318
Condenser pressure drop	kPa	55,3	55,6	46,8	50,8
Compressors	type	scroll			
Quantity	n	2	2	2	2
Refrigerant circuits	n	1	1	1	1
Absorbed power cooling (*)	kW	12,3	14,8	17,5	19,7
Absorbed power heating (**)	kW	12,7	15,9	18,4	20,9
Capacity steps	%	0-50-100	0-50-100	0-50-100	0-50-100
Condenser cooling fans	type	axial			
Total air flow	m^3/s	4,47	4,47	4,47	4,53
	m^3/h	16.100	16.100	16.100	16.300
Fan motor power	n x kW	2 x 0,6	2 x 0,6	2 x 0,6	2 x 0,6
Nominal revolution speed	RPM	860			
Electric motor supply	V/Ph/Hz	230/~/50			
Refrigerant charge					
Chiller version	kg	1 x 14,5	1 x 14,5	1 x 14,5	1 x 19,5
Heat pump version	kg	1 x 15	1 x 15	1 x 15	1 x 22
Oil					
Oil charge	l	2 x 3,3	2 x 3,3	2 x 3,8	1 x 4 + 1 x 3,8
Oil producer		Maneurop			
Oil type		160 SZ			
Evaporator	type	plate			
Heat exchanger water volume	l	4,6	5,7	7,4	8,4
Max operating pressure water side	bar	30			
Dimension and weight					
Length	mm	2.233	2.233	2.233	2.233
Width	mm	1.043	1.043	1.043	1.043
Heigth	mm	1.740	1.740	1.740	1.740
Shipping weight	kg	594	604	625	672

(*) ambient air temperature 35°C; evaporator entering/leaving water temperature 12-7 °C;.
(**) ambient air temperature 8°C DB, 70%RH; condenser entering/leaving water temperature 40-45 °C.

TECHNICAL DATA

R407C refrigerant

MODEL ZETA 2002		7.2	8.2	9.2	10.2
Cooling (*)					
Nominal capacity	kW	67,5	77,6	91,6	102,4
Evaporator water flow	l/s	3,23	3,71	4,37	4,89
	l/h	11.608	13.347	15.748	17.611
Evaporator pressure drop	kPa	43,7	45,4	47,9	44,8
Heating (**)					
Nominal capacity	kW	68,1	78,7	92,7	106,6
Condenser water flow	l/s	3,25	3,76	4,43	5,10
	l/h	11.712	13.530	15.937	18.343
Condenser pressure drop	kPa	44,4	46,5	49	48,4
Compressors	type	scroll			
Quantity	n	2	2	2	2
Refrigerant circuits	n	1	1	1	1
Absorbed power cooling (*)	kW	22,7	26,6	31,3	37,6
Absorbed power heating (**)	kW	23,4	27,5	32,1	36,7
Capacity steps	%	0-50-100	0-50-100	0-50-100	0-50-100
Condenser cooling fans	type	axial			
Total air flow	m^3/s	4,53	4,39	6,83	6,83
	m^3/h	16.300	15.800	24.600	24.600
Fan motor power	n x kW	2 x 0,6	2 x 0,6	3 x 0,6	3 x 0,6
Nominal revolution speed	RPM	860			
Electric motor supply	V/Ph/Hz	230/~/50			
Refrigerant charge					
Chiller version	kg	1 x 19,5	1 x 22	1 x 27,5	1 x 27,5
Heat pump version	kg	1 x 22	1 x 27	1 x 32	1 x 32
Oil					
Oil charge	l	2 x 4	2 x 6,6	1 x 8 + 1 x 6,6	2 x 8
Oil producer		Maneurop			
Oil type		160 SZ			
Evaporator	type	plate			
Heat exchanger water volume	l	4,2	4,8	6,3	7,3
Max operating pressure water side	bar	30			
Dimension and weight					
Length	mm	2.233	2.233	3.234	3.234
Width	mm	1.043	1.043	1.144	1.144
Heigth	mm	1.740	1.740	1.740	1.740
Shipping weight	kg	690	737	981	1.058

(*) ambient air temperature 35°C; evaporator entering/leaving water temperature 12-7 °C;.
(**) ambient air temperature 8°C DB, 70%RH; condenser entering/leaving water temperature 40-45 °C.

TECHNICAL DATA

R407C refrigerant

MODEL ZETA 2002		12.2	13.2	14.4	16.4
Cooling (*)					
Nominal capacity	kW	117,9	126,6	137	157,6
Evaporator water flow	l/s	5,63	6,05	6,55	7,53
	l/h	20.283	21.780	23.567	27.103
Evaporator pressure drop	kPa	50,7	43,2	51,8	55,8
Heating (**)					
Nominal capacity	kW	119,5	132,4	136,2	157,3
Condenser water flow	l/s	5,71	6,33	6,51	7,52
	l/h	20.561	22.779	23.425	27.061
Condenser pressure drop	kPa	52	47	51,2	55,6
Compressors	type	scroll			
Quantity	n	2	2	4	4
Refrigerant circuits	n	1	1	2	2
Absorbed power cooling (*)	kW	40	45,9	44,4	52
Absorbed power heating (**)	kW	40,5	44,4	46,8	55
Capacity steps	%	0-50-100	0-50-100	0-25-50-75-100	0-25-50-75-100
Condenser cooling fans	type	axial			
Total air flow	m^3/s	6,60	6,58	11,27	11,27
	m^3/h	23.760	23.700	40.560	40.560
Fan motor power	n x kW	3 x 0,6	3 x 0,6	2 x 2,0	2 x 2,0
Nominal revolution speed	RPM	860			
Electric motor supply	V/Ph/Hz	230/~/50		400/3~/50	
Refrigerant charge					
Chiller version	kg	1 x 32	1 x 32	2 x 19,5	2 x 21
Heat pump version	kg	1 x 36	1 x 36	2 x 22	2 x 23
Oil					
Oil charge	l	2 x 8	2 x 8	4 x 4	4 x 6,6
Oil producer		Maneurop			
Oil type		160 SZ			
Evaporator	type	plate			
Heat exchanger water volume	l	8,4	9,4	5,2	4,8
Max operating pressure water side	bar	30			
Dimension and weight					
Length	mm	3.234	3.234	3.234	3.234
Width	mm	1.144	1.144	1.119	1.119
Heigth	mm	1.740	1.740	2.380	2.380
Shipping weight	kg	1.124	1.158	1.400	1.464

(*) ambient air temperature 35°C; evaporator entering/leaving water temperature 12-7 °C;.
(**) ambient air temperature 8°C DB, 70%RH; condenser entering/leaving water temperature 40-45 °C.

TECHNICAL DATA

R407C refrigerant

MODEL ZETA 2002		18.4	20.4	24.4	26.4
Cooling (*)					
Nominal capacity	kW	185,8	211	235,8	260,7
Evaporator water flow	l/s	8,88	10,08	11,27	12,45
	l/h	31.965	36.296	40.565	44.834
Evaporator pressure drop	kPa	62	63,8	71,1	70,6
Heating (**)					
Nominal capacity	kW	185,3	213,3	239,1	264,9
Condenser water flow	l/s	8,85	10,19	11,42	12,66
	l/h	31.873	36.686	41.122	45.558
Condenser pressure drop	kPa	61,6	65,1	73	72,8
Compressors	type	scroll			
Quantity	n	4	4	4	4
Refrigerant circuits	n	2	2	2	2
Absorbed power cooling (*)	kW	61,2	72	80	88,1
Absorbed power heating (**)	kW	64,2	73,3	81,1	88,8
Capacity steps	%	0-25-50-75-100	0-25-50-75-100	0-25-50-75-100	0-25-50-75-100
Condenser cooling fans	type	axial			
Total air flow	m^3/s	16,38	16,42	19,39	18,50
	m^3/h	58.950	59.100	69.800	66.600
Fan motor power	n x kW	3 x 2,0	3 x 2,0	4 x 2,0	4 x 2,0
Nominal revolution speed	RPM	880			
Electric motor supply	V/Ph/Hz	400/3~/50			
Refrigerant charge					
Chiller version	kg	2 x 27	2 x 27	2 x 26	2 x 31,5
Heat pump version	kg	2 x 30	2 x 30	2 x 30	2 x 35
Oil					
Oil charge	l	2 x 8 + 2 x 6,6	4 x 8	4 x 8	4 x 8
Oil producer		Maneurop			
Oil type		160 SZ			
Evaporator	type	plate			
Heat exchanger water volume	l	6,3	7,3	8,4	9,4
Max operating pressure water side	bar	30			
Dimension and weight					
Length	mm	4.234	4.234	4.234	4.234
Width	mm	1.119	1.119	1.119	1.119
Heigth	mm	2.380	2.380	2.380	2.380
Shipping weight	kg	1.930	2.089	2.208	2.349

(*) ambient air temperature 35°C; evaporator entering/leaving water temperature 12-7 °C;.
(**) ambient air temperature 8°C DB, 70%RH; condenser entering/leaving water temperature 40-45 °C.

TECHNICAL DATA - ELECTRICAL CHARACTERISTICS AND COMPONENTS

R407C refrigerant

MODEL ZETA 2002		3.2	4.2	5.2	6.2
Maximum absorbed power (1)	kW	17,6	20,6	25,6	28,5
	kW	(18,1)	(21,1)	(26,1)	(29,6)
Maximum starting current	A	120,4	155,4	150,4	205,4
	A	(122,1)	(157,1)	(152,1)	(208,3)
Full load current (2)	A	39,4	45,4	55,4	65,4
	A	(41,1)	(47,1)	(57,1)	(68,3)
Fan motor nominal power	n x kW	2 x 0,6	2 x 0,6	2 x 0,6	2 x 0,6
Fan motor nominal absorbed current	n x A	2 x 2,7	2 x 2,7	2 x 2,7	2 x 2,7
Pump motor nominal power	kW	(1 x 0,5)	(1 x 0,5)	(1 x 0,5)	(1 x 1,1)
Pump motor nominal absorbed power	A	(1 x 1,7)	(1 x 1,7)	(1 x 1,7)	(1 x 2,9)
Power supply	V/Ph/Hz	400V 3N ~ 50Hz ±5% V			
Control power supply	V/Ph/Hz	230/~/50			
Control circuit supply	V/Ph/Hz	24V ~ 50Hz			
Condenser fans supply	V/Ph/Hz	230V/ ~/50Hz			
Pumps supply, ST groups	V/Ph/Hz	400V/3~/50			

Maximum absorbed power (1)	kW	53,4	58,4	64,4	76,4
	kW	(55,6)	(60,6)	(66,6)	(78,6)
Maximum starting current	A	328,1	347,1	288	288
	A	(333,4)	(352,4)	(293,3)	(293,3)
Full load current (2)	A	127,1	146,1	148	148
	A	(132,4)	(151,4)	(153,3)	(153,3)
Fan motor nominal power	n x kW	3 x 0,6	3 x 0,6	2 x 2,0	2 x 2,0
Fan motor nominal absorbed current	n x A	3 x 2,7	3 x 2,7	2 x 4,0	2 x 4,0
Pump motor nominal power	kW	(1 x 2,2)	(1 x 2,2)	(1 x 2,2)	(1 x 2,2)
Pump motor nominal absorbed power	A	(1 x 5,3)	(1 x 5,3)	(1 x 5,3)	(1 x 5,3)
Power supply	V/Ph/Hz	400V 3N ~ 50Hz ±5% V			
Control power supply	V/Ph/Hz	230/~/50			
Control circuit supply	V/Ph/Hz	24V ~ 50Hz			
Condenser fans supply	V/Ph/Hz	230V/ ~/50Hz			
Pumps supply, ST groups	V/Ph/Hz	400V/3~/50			

(1) mains power supply to allow unit operation.
(2) maximum current before safety cut-outs stop the unit. This value is never exceeded and must be used to size the electrical supply cables and relevant safety devices (refer to electrical wiring diagram supplied with the unit).

All values in brackets are refer to /ST version (units with storage tank) or units with pump.

TECHNICAL DATA - ELECTRICAL CHARACTERISTICS AND COMPONENTS

R407C refrigerant

Maximum absorbed power (1)	kW	53,4	58,4	64,4	76,4
	kW	(55,6)	(60,6)	(66,6)	(78,6)
Maximum starting current	A	328,1	347,1	288	288
	A	(333,4)	(352,4)	(293,3)	(293,3)
Full load current (2)	A	127,1	146,1	148	148
	A	(132,4)	(151,4)	(153,3)	(153,3)
Fan motor nominal power	n x kW	3 x 0,6	3 x 0,6	2 x 2,0	2 x 2,0
Fan motor nominal absorbed current	n x A	3 x 2,7	3 x 2,7	2 x 4,0	2 x 4,0
Pump motor nominal power	kW	(1 x 2,2)	(1 x 2,2)	(1 x 2,2)	(1 x 2,2)
Pump motor nominal absorbed power	A	(1 x 5,3)	(1 x 5,3)	(1 x 5,3)	(1 x 5,3)
Power supply	V/Ph/Hz	400V 3N ~ 50Hz ±5% V			
Control power supply	V/Ph/Hz	230/~/50			
Control circuit supply	V/Ph/Hz	24V ~ 50Hz			
Condenser fans supply	V/Ph/Hz	230V/ ~/50Hz			
Pumps supply, ST groups	V/Ph/Hz	400V/3~/50			

Maximum absorbed power (1)	kW	88,8	99,2	111,2	121,2
	kW	(92,8)	(103,2)	(115,2)	(126,7)
Maximum starting current	A	347	377	455	493
	A	(356,5)	(386,5)	(464,5)	(505)
Full load current (2)	A	182	212	254	292
	A	(191,5)	(221,5)	(263,5)	(304)
Fan motor nominal power	n x kW	3 x 2,0	3 x 2,0	4 x 2,0	4 x 2,0
Fan motor nominal absorbed current	n x A	3 x 4,0	3 x 4,0	4 x 4,0	4 x 4,0
Pump motor nominal power	kW	(1 x 4,0)	(1 x 4,0)	(1 x 4,0)	(1 x 5,5)
Pump motor nominal absorbed power	A	(1 x 9,5)	(1 x 9,5)	(1 x 9,5)	(1 x 12,0)
Power supply	V/Ph/Hz	400V 3N ~ 50Hz ±5% V			
Control power supply	V/Ph/Hz	230/~/50			
Control circuit supply	V/Ph/Hz	24V ~ 50Hz			
Condenser fans supply	V/Ph/Hz	400V/3~/50			
Pumps supply, ST groups	V/Ph/Hz	400V/3~/50			

(1) mains power supply to allow unit operation.
(2) maximum current before safety cut-outs stop the unit. This value is never exceeded and must be used to size the electrical supply cables and relevant safety devices (refer to electrical wiring diagram supplied with the unit).

All values in brackets are refer to /ST version (units with storage tank) or units with pump.

TECHNICAL DATA - ZETA 2002 /ST 2PS

R407C refrigerant

MODEL ZETA 2002		3.2	4.2	5.2	6.2
Pump section					
Evaporator water flow	l/s	1,77	2,13	2,45	2,88
	l/h	6.377	7.682	8.833	10.379
Pump nominal power	kW	0,5	0,5	0,5	1,1
External available pressure	kPa	117	103	96	139
Storage tank water volume	l	200	200	200	200
Dimension and weight					
Length	mm	2.233	2.233	2.233	2.233
Width	mm	1.043	1.043	1.043	1.043
Heigth	mm	1.740	1.740	1.740	1.740
Shipping weight	kg	724	734	755	807

MODEL ZETA 2002		7.2	8.2	9.2	10.2
Pump section					
Evaporator water flow	l/s	3,23	3,71	4,37	4,89
	l/h	11.608	13.347	15.748	17.611
Pump nominal power	kW	1,1	1,1	1,5	1,5
External available pressure	kPa	134	112	122	109
Storage tank water volume	l	200	200	450	450
Dimension and weight					
Length	mm	2.233	2.233	3.234	3.234
Width	mm	1.043	1.043	1.144	1.144
Heigth	mm	1.740	1.740	1.740	1.740
Shipping weight	kg	825	868	1.142	1.219

MODEL ZETA 2002		12.2	13.2	14.4	16.4
Pump section					
Evaporator water flow	l/s	5,63	6,05	6,55	7,53
	l/h	20.283	21.780	23.567	27.103
Pump nominal power	kW	2,2	2,2	2,2	2,2
External available pressure	kPa	115	110	134	96
Storage tank water volume	l	450	450	340	340
Dimension and weight					
Length	mm	3.234	3.234	3.234	3.234
Width	mm	1.144	1.144	1.119	1.119
Heigth	mm	1.740	1.740	2.380	2.380
Shipping weight	kg	1.275	1.309	1.642	1.678

MODEL ZETA 2002		18.4	20.4	24.4	26.4
Pump section					
Evaporator water flow	l/s	8,88	10,08	11,27	12,45
	l/h	31.965	36.296	40.565	44.834
Pump nominal power	kW	4	4	4	5,5
External available pressure	kPa	138	124	101	159
Storage tank water volume	l	700	700	700	700
Dimension and weight					
Length	mm	5.234	5.234	5.234	5.234
Width	mm	1.119	1.119	1.119	1.119
Heigth	mm	2.380	2.380	2.380	2.380
Shipping weight	kg	2.290	2.449	2.622	2.749

SOUND POWER AND PRESSURE LEVELS

STANDARD UNITS

ZETA 2002	Octave band [Hz] 63		125		250		500		1000		2000		4000		8000		Total	
	dB		dB		dB		dB		dB		dB		dB		dB		dB(A)	
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp
3.2	96,1	78,8	87,3	70,0	81,2	63,8	79,7	62,4	78,6	61,3	73,2	55,9	69,8	52,4	60,7	43,4	83,0	65,7
4.2	96,5	79,1	87,7	70,3	81,5	64,2	80,0	62,7	78,9	61,6	73,6	56,2	70,1	52,8	61,0	43,7	83,3	66,0
5.2	96,6	79,2	87,8	70,4	81,6	64,3	80,1	62,8	79,0	61,7	73,7	56,3	70,2	52,9	61,1	43,8	83,4	66,1
6.2	97,3	79,9	88,5	71,1	82,3	65,0	80,8	63,5	79,7	62,4	74,4	57,0	70,9	53,6	61,8	44,5	84,1	66,8
7.2	97,5	80,1	88,7	71,3	82,5	65,2	81,0	63,7	79,9	62,6	74,6	57,2	71,1	53,8	62,0	44,7	84,3	67,0
8.2	98,1	80,8	89,3	72,0	83,2	65,8	81,7	64,4	80,6	63,2	75,2	57,9	71,8	54,4	62,7	45,3	85,0	67,7
9.2	99,7	81,8	90,9	73,0	84,8	66,8	83,3	65,4	82,2	64,2	76,9	58,9	73,4	55,4	64,3	46,3	86,6	68,7
10.2	100,0	82,0	91,2	73,2	85,0	67,0	83,5	65,6	82,4	64,5	77,1	59,1	73,6	55,6	64,5	46,6	86,8	68,9
12.2	100,1	82,2	91,3	73,4	85,1	67,3	83,7	65,8	82,6	64,7	77,2	59,3	73,7	55,9	64,7	46,8	87,0	69,1
13.2	100,3	82,3	91,5	73,5	85,3	67,3	83,8	65,9	82,7	64,8	77,4	59,4	73,9	55,9	64,8	46,9	87,1	69,2
14.4	101,1	82,5	92,3	73,7	86,1	67,5	84,6	66,0	83,5	64,9	78,2	59,6	74,7	56,1	85,6	47,0	87,9	69,3
16.4	103,6	85,0	94,8	76,2	88,6	70,1	87,2	68,6	86,1	67,5	80,7	62,1	77,2	58,7	68,2	49,6	90,5	71,9
18.4	104,5	85,4	95,7	76,6	89,6	70,5	88,1	69,0	87,0	67,9	81,6	62,5	78,2	59,1	69,1	50,0	91,4	72,3
20.4	105,2	86,1	96,4	77,3	90,3	71,2	88,8	69,7	87,7	68,6	82,3	63,2	78,9	59,8	69,8	50,7	92,1	73,0
24.4	106,1	87,0	97,3	78,2	91,2	72,1	89,7	70,6	88,6	69,5	83,2	64,1	79,8	60,7	70,7	51,6	93,0	73,9
26.4	106,2	87,1	97,4	78,3	91,3	72,2	89,8	70,7	88,7	69,6	83,3	64,2	79,9	60,8	70,8	51,7	93,1	74,0

LOW NOISE UNITS

ZETA 2002 /LN	Octave band [Hz] 63		125		250		500		1000		2000		4000		8000		Total	
	dB		dB		dB		dB		dB		dB		dB		dB		dB(A)	
	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp
3.2	93,4	76,0	84,6	67,2	78,4	61,1	76,9	59,6	75,8	58,5	70,5	53,1	67,0	49,7	57,9	40,6	80,2	62,9
4.2	93,5	76,2	84,7	67,4	78,5	61,3	77,0	59,8	75,9	58,7	70,6	53,3	67,1	49,9	58,0	40,8	80,3	63,1
5.2	93,7	76,4	84,9	67,6	78,7	61,5	77,2	60,0	76,1	58,9	70,8	53,5	67,3	50,1	58,2	41,0	80,5	63,3
6.2	94,3	77,0	85,5	68,2	79,3	62,1	77,8	60,6	76,7	59,5	71,4	54,1	67,9	50,7	58,8	41,6	81,1	63,9
7.2	94,4	77,1	85,6	68,3	79,4	62,2	77,9	60,7	76,8	59,6	71,5	54,2	68,0	50,8	58,9	41,7	81,2	64,0
8.2	96,3	79,0	87,5	70,2	81,3	64,1	79,8	62,6	78,7	61,5	73,4	56,1	69,9	52,7	60,8	43,6	83,1	65,9
9.2	97,3	79,0	88,5	70,6	82,3	64,5	80,9	63,0	79,8	61,9	74,4	56,5	70,9	53,1	61,9	44,0	84,2	66,3
10.2	97,8	79,5	89,0	71,1	82,8	65,0	81,4	63,5	80,3	62,4	74,9	57,0	71,4	53,6	62,4	44,5	84,7	66,8
12.2	97,3	79,0	88,5	70,6	82,3	64,5	80,9	63,0	79,8	61,9	74,4	56,5	70,9	53,1	61,9	44,0	84,2	66,3
13.2	97,6	79,3	88,8	70,9	82,6	64,8	81,2	63,3	80,1	62,2	74,7	56,8	71,2	53,4	62,2	44,3	84,5	66,6
14.4	99,1	80,5	90,3	71,7	84,1	65,5	82,6	64,0	81,5	62,9	76,2	57,6	72,7	54,1	63,6	45,0	85,9	67,3
16.4	101,8	82,6	93,0	74,4	86,8	68,3	85,4	66,8	84,3	65,7	78,9	60,3	75,4	56,9	66,4	47,8	88,7	70,1
18.4	102,6	82,7	93,8	74,7	87,7	68,6	86,2	67,1	85,1	66,0	79,7	60,6	76,3	57,2	67,2	48,1	89,5	70,4
20.4	103,0	83,1	94,2	75,1	88,1	69,0	86,6	67,5	85,5	66,4	80,1	61,0	76,7	57,6	67,6	48,5	89,9	70,8
24.4	103,9	84,0	95,1	76,0	89,0	69,9	87,5	68,4	86,4	67,3	81,0	61,9	77,6	58,5	68,5	49,4	90,8	71,7
26.4	104,0	84,1	95,2	76,1	89,1	70,0	87,6	68,5	86,5	67,4	81,1	62,0	77,7	58,6	68,6	49,5	90,9	71,8

Lw: sound power values in free field conditions are calculated in accordance with ISO 3746.
Lp : sound pressure values measured at 1 m from the unit in free field conditions in compliance with ISO 3746

SOUND POWER AND PRESSURE LEVELS

EXTRA LOW NOISE UNITS

ZETA	Octave band [Hz]																Total	
	63		125		250		500		1000		2000		4000		8000			
2002	dB		dB		dB		dB		dB		dB		dB		dB		dB(A)	
/SLN	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp	Lw	Lp
3.2	90,2	73,0	81,4	64,2	75,3	58,1	73,8	56,6	72,7	55,5	67,3	50,1	63,9	46,7	54,8	37,6	77,1	59,9
4.2	90,6	73,5	81,8	64,7	75,7	58,6	74,2	57,1	73,1	56,0	67,7	50,6	64,3	47,2	55,2	38,1	77,5	60,4
5.2	91,1	73,9	82,3	65,1	76,2	59,0	74,7	57,5	73,6	56,4	68,2	51,0	64,8	47,6	55,7	38,5	78,0	60,8
6.2	91,8	74,6	83,0	65,8	76,9	59,7	75,4	58,2	74,3	57,1	68,9	51,7	65,5	48,3	56,4	39,2	78,7	61,5
7.2	92,1	74,9	83,3	66,1	77,2	60,0	75,7	58,5	74,6	57,4	69,2	52,0	65,8	48,6	56,7	39,5	79,0	61,8
8.2	94,8	76,8	86,0	68,0	79,9	61,9	78,4	60,4	77,3	59,3	71,9	53,9	68,5	50,5	59,4	41,4	81,7	63,7
9.2	95,0	77,1	86,2	68,3	80,1	62,2	78,6	60,7	77,5	59,6	72,1	54,2	68,7	50,8	59,6	41,7	81,9	64,0
10.2	95,7	77,8	86,9	69,0	80,8	62,9	79,3	61,4	78,2	60,3	72,8	54,9	69,4	51,5	60,3	42,4	82,6	64,7
12.2	95,3	77,4	86,5	68,6	80,4	62,5	78,9	61,0	77,8	59,9	72,4	54,5	69,0	51,1	59,9	42,0	82,2	64,3
13.2	95,6	77,7	86,8	68,9	80,7	62,8	79,2	61,3	78,1	60,2	72,7	54,8	69,3	51,4	60,2	42,3	82,5	64,6
14.4	97,1	78,1	88,3	69,3	82,1	63,1	80,6	61,6	79,5	60,5	74,2	55,2	70,7	51,7	61,6	42,6	83,5	64,9
16.4	99,6	81,0	90,8	72,2	84,7	66,1	83,2	64,6	82,1	63,5	76,7	58,1	73,3	54,7	64,2	45,6	86,5	67,9
18.4	100,1	80,9	91,3	72,1	85,2	66,0	83,7	64,5	82,6	63,4	77,2	58,0	73,8	54,6	64,7	45,5	87,0	67,8
20.4	100,7	81,5	91,9	72,7	85,8	66,6	84,3	65,1	83,2	64,0	77,8	58,6	74,4	55,2	65,3	46,1	87,6	68,4
24.4	101,6	82,5	92,8	73,7	86,7	67,6	85,2	66,1	84,1	65,0	78,7	59,6	75,3	56,2	66,2	47,1	88,5	69,4
26.4	102,3	82,7	93,5	73,9	87,4	67,8	85,9	66,3	84,8	65,2	79,4	59,8	76,0	56,4	66,9	47,3	89,2	69,6

Lw: sound power values in free field conditions are calculated in accordance with ISO 3746.
Lp : sound pressure values measured at 1 m from the unit in free field conditions in compliance with ISO 3746

1. FIELD OF APPLICATION

The equipment is designed for cooling (chiller only versions) or cooling/heating (heat pump version) water, which is usually utilised for air conditioning or refrigeration applications.
The units must be used exclusively within the operating limits specified in Section 4.

1.1 INTRODUCTION

- When installing or servicing the unit, it is necessary to strictly follow the rules described in this manual, to conform to all the items detailed on the unit labels and take any necessary precaution.

- Pressure in refrigerant circuits and danger from electrical shock can be hazardous when installing or servicing the unit.

- The warranty will be invalid if the rules described in this manual are not observed and if any modifications are made to the unit without prior authorisation of the manufacturer.

Any work on the unit must be carried out by trained people only.

Attention: before repairing or servicing the unit, ensure that the electrical supply is disconnected.

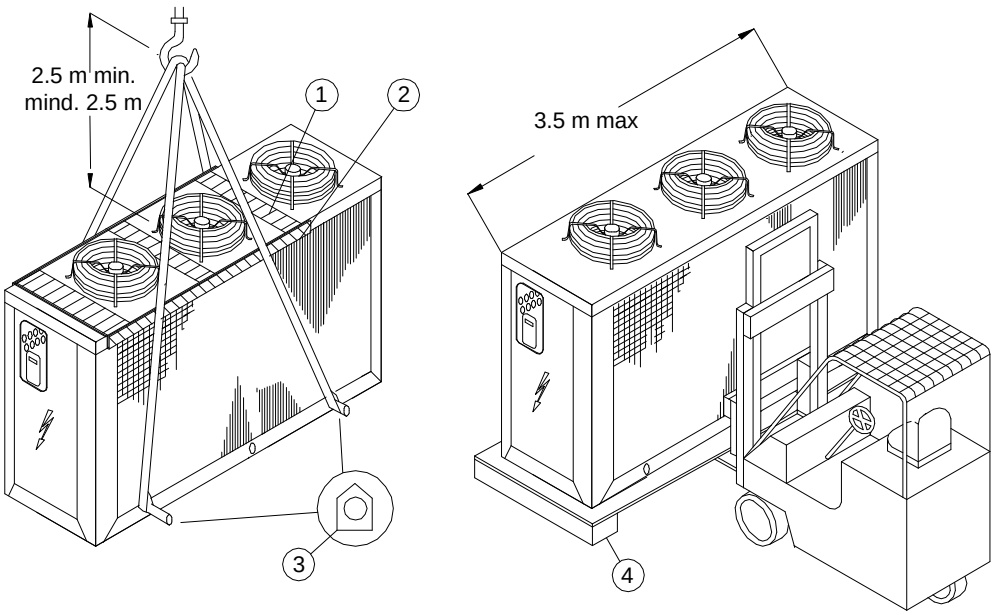
2. INSPECTION, TRANSPORT, SITE HANDLING

2.1 INSPECTION

After receiving the unit, immediately check its integrity. The unit will have left the factory in perfect condition. Therefore on receiving the unit any damage must be verbally described to the carrier and recorded on the Delivery Note before it is signed by both parties. Blue Box or their Agent must be informed as soon as possible of the extent of the damage.
The Customer should prepare a written statement and photographic evidence regarding any severe damage.

2.2 LIFTING AND SITE HANDLING

Avoid sudden movements and jolts when unloading and positioning the unit. Internal handling procedures must be conducted with care. Do not exert leverage on the components of the machine. The unit must be lifted by inserting steel tubes through the lifting attachments shown by the relative signs (yellow arrow).
The unit must be lifted by harnessing it as shown in figure 1: use ropes or straps of sufficient length and spacer bars to avoid damage to the unit's side panels and cover. Alternatively, the unit (with a maximum length less than 3.5 m) can be lifted by a forklift truck, inserting the forks under the pallet.



(1) Space bar (not supplied)
(2) Side panel protection (not supplied)
(3) Lifting holes
(4) Pallet

Figure 1

Caution: ensure that the method of lifting does not allow the unit to slip from chains and slings and does not allow the unit to turn over or slide from lifting devices.

2.3 UNPACKING

When unpacking the unit pay attention not to damage the unit.
Packaging consists of different materials: wood, paper, nylon etc.
Separate the materials and deliver to the proper gathering centre in order to reduce their environmental impact.

3. SAFETY PRECAUTIONS

3.1 DEFINITION OF DANGER ZONE

Only authorised operators must be allowed in the vicinity of the unit.

- The external danger zone concerns a space of approximately 2 m in width around the perimeter of the machine. Access to this area must be prevented by suitable guarding in the event that the unit is located in an unprotected area that is easily accessible to unauthorised persons.

- The internal danger zone is defined as the interior of the machine. Access to the interior of the machine must not be permitted to unqualified personnel and never before the machines' electrical supply has been disconnected.

3.2 SAFETY PRESCRIPTIONS

The unit is designed and built in accordance with the PED 97/23CE rules, to ensure the maximum level of safety. To avoid possible situations of risk adhere to the following rules at all times:

- All work on the unit must be performed by qualified personnel. Before working on the unit, ensure that the designated personnel are conversant with the documentation supplied. Always ensure there is a copy of the documentation in the immediate vicinity of the unit.

- Use the appropriate personal safety equipment (gloves, helmet, safety goggles, safety footwear, etc.) for all maintenance and control operations on the unit.

- Use only tools and equipment that are in good working order.

- The fans have protective grilles to prevent accidental contact. Use the maximum caution to avoid inserting or dropping objects through the grilles.

- The exchanger coils have sharp edges. Do not touch the coils without using suitable protection.

- The compressor compartment contains various high temperature components. Adopt the maximum caution when working in the vicinity of the compressors and avoid touching any parts of the unit without appropriate protection.

- Do not work within the theoretical discharge trajectory of the relief valves.

MECHANICAL HAZARDS

Operating mode	Analysed risk or hazard	Solution adopted
Normal operating regime Maintenance	Stability	Because of their intrinsic characteristics, the units are not associated with problems of possible falling or tipping while in operation. Carefully read the items described in this manual concerning the methods of positioning the unit.
Handling during transport and installation.	Stability	The unit's base frame has specific lifting holes; the positions of which are marked with yellow decals. Following this procedure will eliminate the risk of the unit tipping. Carefully read the items descriptions in this manual concerning the methods of handling the unit.
Normal operating regime Maintenance	Pipeline bursts.	Pipes are rigidly anchored to reduce the degree of vibration.
Operating regime	Surfaces, sharp corners and edges.	The machine is designed and built in such a way as to minimise the presence of sharp corners and edges as far as possible.
Maintenance	Surfaces, sharp corners and edges.	In the interior parts of the unit it is not possible to totally eliminate risks from the presence of surfaces, sharp corners and edges. The operating, installation, and maintenance manual specifies that maintenance operations should be carried out exclusively by qualified personnel, and provides indications of the protective equipment to be used.
Normal operating regime	Cutting or severing.	The moving parts of the unit are located in clearly defined areas. Specifically, the fans are enclosed in an inaccessible compartment and are equipped with an upper protection grille to UNI EN 294. All the protections supplied to limit and enclose the fan compartments cannot be removed without the use of special tools.
Maintenance	Cutting or severing.	The moving parts of the unit are located in clearly defined areas. Specifically, the fans are enclosed in an inaccessible compartment and are equipped with an upper protective grille to UNI EN 294. If present, the fan speed regulator accessory, located in the condensing section compartment, does not require adjustment or calibration during maintenance operations.
Normal operating regime	Cutting or severing.	All units are supplied as standard with specific protection grilles designed to protect against accidental contact with the finned coils, which can cause minor cuts to the hands.

MECHANICAL HAZARDS

Operating mode	Analysed risk or hazard	Solution adopted
Maintenance	Cutting or severing.	The operating, installation, and maintenance manual describes the use of suitable protections to avoid contact with the finned coils, which can cause slight wounds to the hands.
Normal operating regime	Entanglement, dragging, impact.	The moving parts of the unit are located in clearly defined areas. Specifically, the fans are enclosed in an inaccessible compartment and they are equipped with an upper protective grille to UNI EN 294. All the protections supplied to limit and enclose the fan compartments cannot be removed without the use of special tools.
Maintenance	Entanglement, dragging, impact.	The moving parts of the unit are located in clearly defined areas. Specifically, the fans are enclosed in an inaccessible compartment and they are equipped with an upper protective grille to UNI EN 294. If present, the fan speed regulator accessory, located in the condensing section compartment, does not require adjustment or calibration during maintenance operations.
Normal operating regime Maintenance	Projection of high pressure jets of fluid - Explosion hazard	All units are equipped with relief valves to eliminate the risk of pressure bursts. The outlet from relief valves must be piped appropriately to eliminate risks associated with the expulsion of gas at high pressure from the machine. The warnings regarding these expulsion points are fixed to the outside of the unit and given in the operating and maintenance manual.

THERMAL HAZARDS

Operating mode	Analysed risk or hazard	Solution adopted
Normal operating regime	Burns caused by high temperatures.	Most of the pipelines that could cause burns, when touched, are lagged with heat insulating material. All the parts that are potentially dangerous are confined in compartments that cannot be accessed without the use of tools
Maintenance	Burns caused by high temperatures.	Most of the pipelines that could cause burns, when touched, are lagged with heat insulating material. The operating, installation, and maintenance manual describes the use of suitable protections to avoid contact with high temperature pipelines that could result in burns.

NOISE-RELATED HAZARDS

Operating mode	Analysed risk or hazard	Solution adopted
Normal operating regime Maintenance	Hearing damage.	All units are designed and built with the aim of reducing noise emissions to the minimum.

ELECTRICAL HAZARDS

Operating mode	Analysed risk or hazard	Solution adopted
Normal operating regime Maintenance	Contact with electrically live parts (direct contact).	All units are designed and built in compliance with harmonised standard EN 60204-1.
Normal operating regime Maintenance	Elements carrying electrical current in the case of faults.	
Normal operating regime Maintenance	Inappropriate insulation.	
Normal operating regime Maintenance	Radiated heat due to short-circuits or overloads.	

R407C REFRIGERANT SAFETY SHEETS

1. IDENTIFICATION OF THE SUBSTANCE	1.1	Identification of the preparation:	407C
		Synonyms:	HFC-32lHFC-125lHFG134a
		Formula:	Mixture
		EE-No:	difluoromethane (HFC-32) : 200-839-4 1-1-1-2-tetrafluoroethane UHFC-134a) : 212-377-0 pentafluoroethane (HFC-125) : 206-557-8

2. COMPOSITION / INFORMATION ON INGREDIENTS	Chemical Name	CAS-No - Wt % - Symbol(s): & phrases "R"	
	difluoromethane	75/10/5 - 23 - F+;R12	
	1-2-2-2-tetrafluoroethane	811/97/2 - 52	
	pentafluoroethane	354/33/ 6 - 25	

3. HAZARDS IDENTIFICATION:	3.1	Most important hazards:	Liquefied gas: may cause frostbite. Contact with eyes may cause irritation.

4. FIRST-AID MEASURES:	4.1	Eyes	Rinse immediately with plenty of water for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.
		Skin	Liquefied gas may cause frostbite. Wash frostbitten areas with plenty of water. Do not remove clothing. Wash off with warm water. if skin irritation persists, call a physician.
		Inhalation	Move to fresh air in case of accidental inhalation of vapours. Oxygen or artificial respiration if needed. Do not apply artificial respiration if patient is breathing; Consult a physician after significant exposure. Do not give adrenaline or similar drugs.
		Ingestion	Do not induce vomiting without medical advice. Call a physician immediately. Do not give drugs from adrenaline-ephedrine group.
		General advice	Consult a physician alter significant exposure.

5. FIRE-FIGHTING MEASURES:	5.1	Suitable extinguishing media:	The product itself does not burn. Extinguish with carbon dioxide, dry chemical, foam or water spray. Use extinguishing measures that are appropriate to the environment.
	5.2	Extinguishing media which must not be used for safety reasons:	None
	5.3	Specific hazards:	Possibility of generating hazardous reactions during a fire due to the presence of F and/or Cl groups. Fire or intense heat may cause violent rupture of packages.
	5.4	Special protective equipment for fire-fighters:	In case of fire, west a self contained breathing apparatus. Protective suit.
	5.5	Specific methods:	Standard procedure for chemical fires. In the event of fire, cool tanks with water spray.

6. ACCIDENTAL RELEASE MEASURES:	6.1	Personal precautions:	*Use* personal protective equipment. Evacuate personnel to safe areas. Do not breath vapours or spray mist. Ensure adequate ventilation.
	6.2	Methods for cleaning up:	Shut off leaks it without risk. Solid evaporates. Ensure adequate ventilation.

7. HANDLING AND STORAGE:	7.1	Handling:	Keep away from heat, sources of ignition. Do not puncture or drop container, Provide sufficient air exchange and / or exhaust in work rooms.
	7.2	Storage:	Keep containers tightly closed in a cool, well-ventilated place. Store in a cool and shaded area. Do not expose to temperatures above 50 °C. Keep tightly closed.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION:	8.1	Engineering measures to reduce exposure:	Ensure adequate ventilation, especially in confined areas.
	8.2	Personal protection equipment:	
		Respiratory protection:	In case of insufficient ventilation wear suitable respiratory equipment, preferably a compressed airline breathing apparatus.
		Hand protection:	Impervious butyl rubber gloves.
		Eye protection:	Wear as appropriate: safety glasses, gaggles, Wear face-shield and protective suit for abnormal processing problems.
		Skin and body protection:	Chemical resistant apron, long sleeved clothing, safety shoes.
	8.3	Exposure limit(s):	1-1-1-2-tetrafluoroethane 1000 ppm (TWA); difluoromethane: 1000 ppm (TWA); pentafluoroethane: 1000 ppm (TWA)(AIHA);

9. STABILITY AND REACTIVITY:	9.1	Stability:	Stable at normal conditions. No decomposition if stored and applied as directed. Decomposition starting from 250°C.
	9.2	Conditions to avoid:	Do not expose to temperatures above 50 °C. Fire or Intense heat may cause violent rupture of packages.
	9.3	Materials to avoid:	alkaline metals (Na, K), alkaline earth metals (Ca, Mg), finely divided aluminium, zinc.
	9.4	Hazardous decomposition products:	halogenated compounds, hydrogen halides (HF, HCl), carbonyl halides ($COCl_2$), carbon monoxide, carbon dioxide ($C0_2$).

10. TOXICOLOGICAL INFORMATION:	10.1	Acute toxicity:	LC50/inh./4 h/rat : > 500000 ppm
	10.2	Irritation :	
		Skin:	slightly irritant, may cause frostbite.
		Eyes:	slightly irritant.
	10.4	Chronic toxicity:	chronic inhalation, no-observed-effect level (NOEL):> 10000pprn rat.

11. DISPOSAL CONSIDERATIONS:	11.1	Waste from residues / unused products:	Offer surplus and non-recyclable solutions to an established disposal company. In accordance with local and national regulations. S59 - Refer to manufacturer/supplier for information on recovery/recycling.
		Contaminated packaging:	Do not reuse empty containers. Empty pressure vessels should be returned to supplier.

12. TRANSPORT INFORMATIQN:	No. O.N.U.	3340
	ADR/RID	UN 3340 Refrigerant gas R407C, 2, 2° A, ADR/RID Label: 2

R22 REFRIGERANT SAFETY SHEETS

1. IDENTIFICATION OF THE SUBSTANCE	1.1	Identification of the preparation:	HCFC-22
		Synonyms:	chlorodifluoromethane
		Formula:	$CHClF_2$
		CAS-No	75-45-6
		EEC-No	200-871-9

2. COMPOSITION / INGREDIENTS	Chemical Name	CAS-No - Wt % - Symbol(s): & phrases "R"	
	Chlorodifluoromethane	75/45/6 - 100 - R59	

3. HAZARDS	3.1	Major hazards:	Causes damage to ozone layer.

4. FIRST-AID MEASURES:	4.1	Eyes	Rinse immediately with plenty of water for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.
		Skin	Liquefied gas may cause frostbite. Wash frostbitten areas with plenty of water. Do not remove clothing. Wash off with warm water. if skin irritation persists, call a physician.
		Inhalation	Move to fresh air in case of accidental inhalation of vapours. Oxygen or artificial respiration if needed. Do not apply artificial respiration if patient is breathing; Consult a physician after significant exposure. Do not give adrenaline or similar drugs.
		Ingestion	Do not induce vomiting without medical advice. Call a physician immediately. Do not give drugs from adrenaline-ephedrine group.
		General advice	Consult a physician alter significant exposure.

5. FIRE-FIGHTING MEASURES:	5.1	Suitable extinguishing media:	The product itself does not burn. Extinguish with carbon dioxide, dry chemical, foam or water spray. Use extinguishing measures that are appropriate to the environment.
	5.2	Extinguishing media which must not be used for safety reasons:	None
	5.3	Specific hazards:	Possibility of generating hazardous reactions during a fire due to the presence of F and/or Cl groups. Fire or intense heat may cause violent rupture of packages.
	5.4	Special protective equipment for fire-fighters:	In case of fire, west a self contained breathing apparatus. Protective suit.
	5.5	Specific methods:	Standard procedure for chemical fires. In the event of fire, cool tanks with water spray.

6. ACCIDENTAL RELEASE MEASURES:	6.1	Personal precautions:	Use personal protective equipment. Evacuate personnel to safe areas. Do not breath vapours or spray mist. Ensure adequate ventilation.
	6.2	Methods for cleaning up:	Shut off leaks it without risk. Solid evaporates. Ensure adequate ventilation.

7. HANDLING AND STORAGE:	7.1	Handling:	Keep away from heat, sources of ignition. Do not puncture or drop container. Provide sufficient air exchange and / or exhaust in work rooms.
	7.2	Storage:	Keep containers tightly closed in a cool, well-ventilated place. Store in a cool and shaded area. Do not expose to temperatures above 50 °C. Keep tightly closed.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION:	8.1	Engineering measures to reduce exposure:	Ensure adequate ventilation, especially in confined areas.
	8.2	Personal protection equipment:	
		Respiratory protection:	In case of insufficient ventilation wear suitable respiratory equipment, preferably a compressed airline breathing apparatus.
		Hand protection:	Impervious butyl rubber gloves.
		Eye protection:	Wear as appropriate: safety glasses, gaggles, Wear face-shield and protective suit for abnormal processing problems.
		Skin and body protection:	Chemical resistant apron, long sleeved clothing, safety shoes.
	8.3	Exposure limit(s):	Chlorodifluoromethane: 3600 mg/m3, 1000 ppm (TLV)

9. STABILITY AND REACTIVITY:	9.1	Stability:	Stable
	9.2	Conditions to avoid:	Keep well clear of naked flame and sparks. Do not smoke. If burned, the product can give off toxic fumes . use self-contained breathing apparatus.
	9.3	Materials to avoid:	alkaline earth metals, alkaline metals, aluminium precipitate, zinc.
	9.4	Hazardous decomposition products:	halogenated compounds (e. g. acids), carbonyl halides.

10. TOXICOLOGICAL INFORMATION:	10.1	Acute toxicity:	LC50/inh./4 h/rat : > 300,000 ppm
	10.2	Irritation:	
	10.3	Sensitisation:	Hearth sensitisation: 50,000 ppm
	10.4	Chronic toxicity:	Sub-chronic exposure, effects not observed below level (NOEL): 10,000 ppm

11. DISPOSAL CONSIDERATIONS:	11.1	Waste from residues / unused products:	Offer surplus and non-recyclable solutions to an established disposal company. In accordance with local and national regulations. S59 - Refer to manufacturer/supplier for information on recovery/recycling.
		Contaminated packaging:	Do not reuse empty containers. Empty pressure vessels should be returned to supplier.

12. TRANSPORT INFORMATIQN:	No. O.N.U.	1018
	ADR/RID	UN 1018 Chlorodifluoromethane, 2, 2° A, ADR/RID Label: 2

3.3 POSITIONING

Read the following points carefully when choosing the most suitable site for the unit and its connections:

- dimensions and connection point of hydraulic pipelines;
- location of the electrical power connection point;
- accessibility for maintenance and repair work;
- loading capacity and compactness of the supporting surface;
- ventilation of air-cooled condenser;
- orientation and exposure to sunlight; as far as possible the condenser coil should not be exposed to direct sunlight;
- direction of prevailing winds: do not position the unit in such a way that prevailing winds can give rise to air recirculation at the condenser coil;
- type of support surface: to limit the risk of overheating, do not install the unit on a dark coloured surface (e.g.bitumen roofing membranes and compounds);
- possible sound reverberation.

All models in the ZETA 2002 series are designed for exterior installation (patios, gardens, etc.):
of undesirable air recirculation, these units must not be covered by a shelter roof or located under trees (even if the unit is only partially covered).
It is advisable to make a supporting plinth of dimensions commensurate with the footprint of the unit. This precaution is indispensable if the unit is to be located on unstable ground (various types of terrain, gardens, etc.).
to avoid the risks of undesirable air recirculation, these units must not be covered by a shelter roof or located under trees (even if the unit is only partially covered).
It is advisable to make a supporting plinth of dimensions commensurate with the footprint of the unit. This precaution is indispensable if the unit is to be located on unstable ground.

The unit transmits a low level of vibration to the supporting structure: we recommend interposing a layer of rigid rubber sheeting between the base of the unit and the supporting surface.
If a higher level of vibration damping is required, use anti-vibration mounts (contact Bluebox for details).

The units should not be installed next to offices, bedrooms, or other areas where low noise levels are a necessity.
To avoid excess sound reverberation do not install the units in narrow or confined spaces.

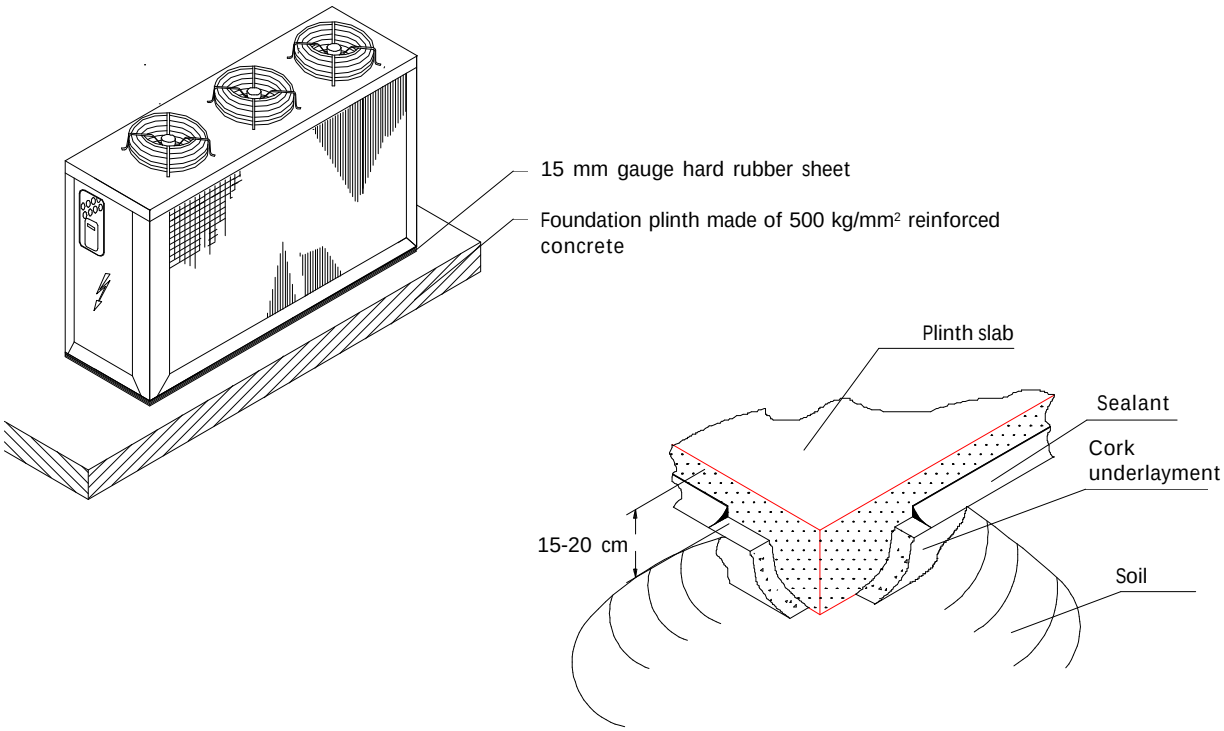


Figure 2

4. INSTALLATION

4.1 INSTALLATION CLEARANCES

It is important that an adequate air volume is available at the intake and exhaust sides of the condenser coil. It is essential to avoid air recirculation between the intake and exhaust sides to prevent a reduction of the rated performance levels and unit operating problems.
The minimum clearances required for satisfactory operation of the unit is as follows (refer to figures 3 and 4):

- condensing coil side: 1.5 metres
- electrical panel side: 1 metre
- compressors compartment side: 1 metre
- hydraulic connection sides: 1 metre.
- top: no impediments that obstruct the air discharge.
- units installed side by side: 4 metres.

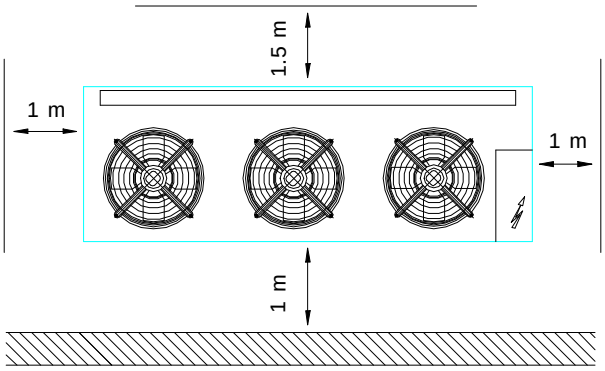


Figure 3

SIDE BY SIDE UNITS

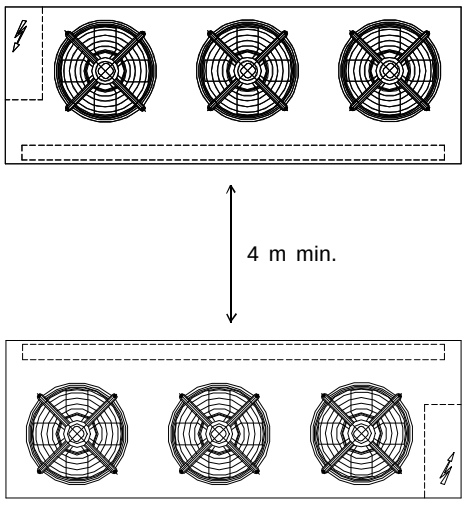


Figure 4

4.2 ANTI-VIBRATION ISOLATORS (option)

It is recommended that the unit is installed on rubber or spring anti-vibration mountings, supplied as an option, to reduce vibrations transmitted to the building structure. It is advisable to use rubber isolators for units installed in the basement, or ground floors in contact with the earth, and spring isolators for units installed on intermediate floors.

The anti-vibration isolators must be installed before the unit is positioned. Ensure that during lifting the unit is firmly secured with straps.

4.2.1 Rubber Anti-Vibration Isolators

Rubber isolators are made of an upper metallic bell with a fixing screw to the base-frame of the unit. The isolator is fixed at the foundation via 2 holes on the flange. On the flange there is a number (45, 60, 70 ShA) which identifies the hardness of the rubber isolator. The dimensional drawing, enclosed in the machine, shows the unit footprint with the position and weight of each isolator.

Rubber/metal anti-vibration isolator
Designed to reduce the vibration.

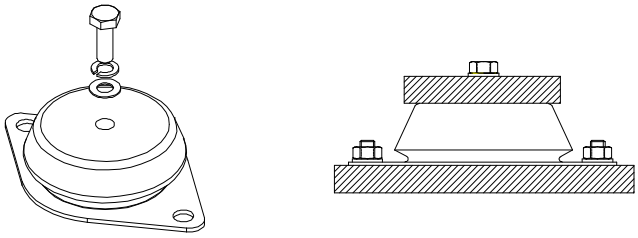
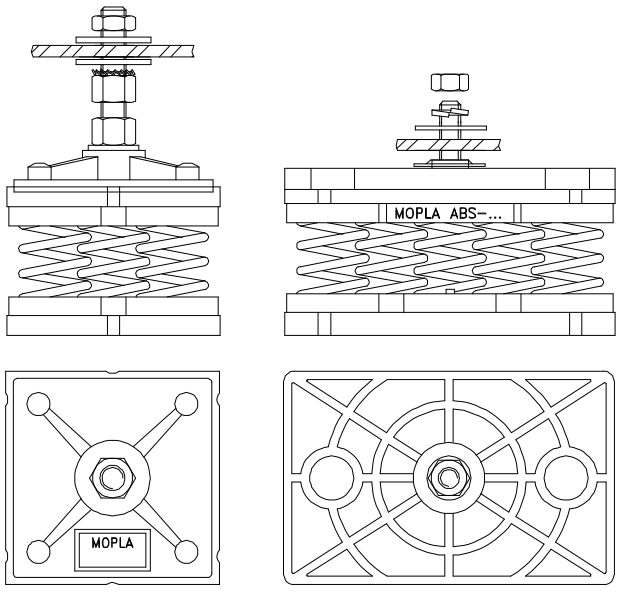


Figure 5

4.2.2 Spring Anti-Vibration Isolators

Anti-Vibration Isolators with cylindrical springs are recommended to reduce any mechanical and sound vibration. Each isolator has a code which identifies the maximum permitted load.
When installing spring Anti-Vibration Isolators, it is compulsory to carefully follow all recommendations and assembly instructions. The dimensional drawing, enclosed in the machine, shows the footprint with the position and weight of each isolator.

Standard spring anti-vibration isolators
The isolator is fixed to the unit's baseframe with a nut and two bolts and washers.



Spring anti-vibration isolators for heavy loads
The load of the unit is supported by the full surface of the isolators. The load is not exerted on the bolt.

Figure 6

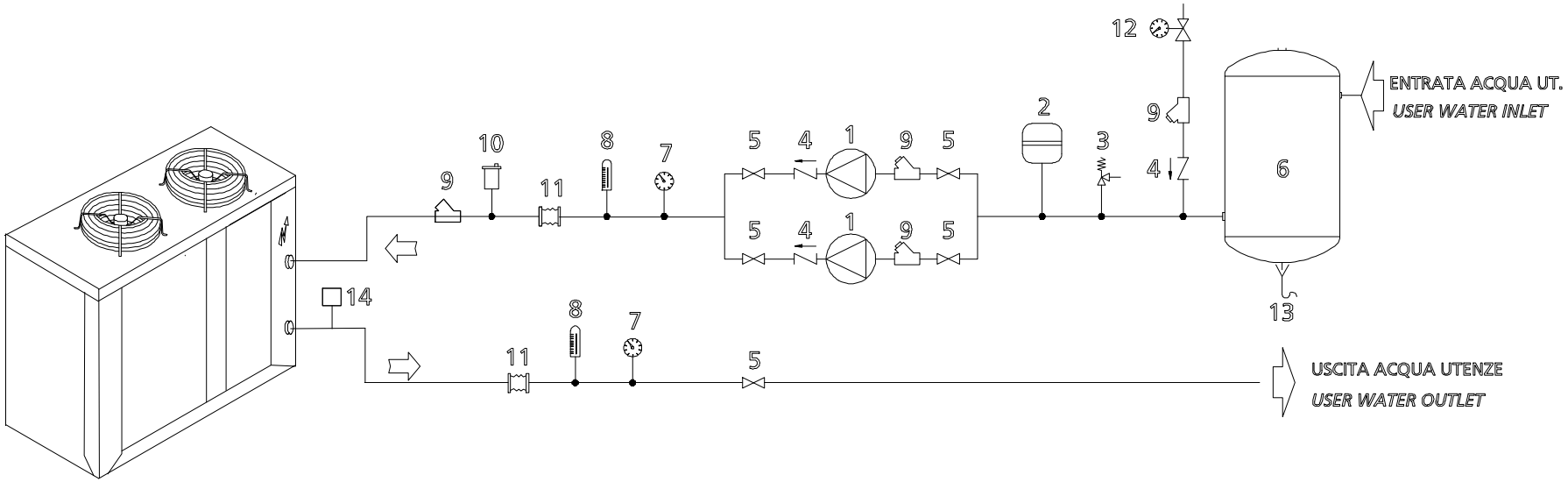
4.3 WATER PIPING CONNECTIONS

Unit water pipework must be installed in accordance with national and local regulation and codes.
Follow the recommendations below when designing the water piping circuit (refer to the diagrams included in this manual).

- Piping should be connected to the unit with flexible joints, to avoid vibration transmission and allow for thermal expansion (the same procedure should be adopted for the circulating pumps).

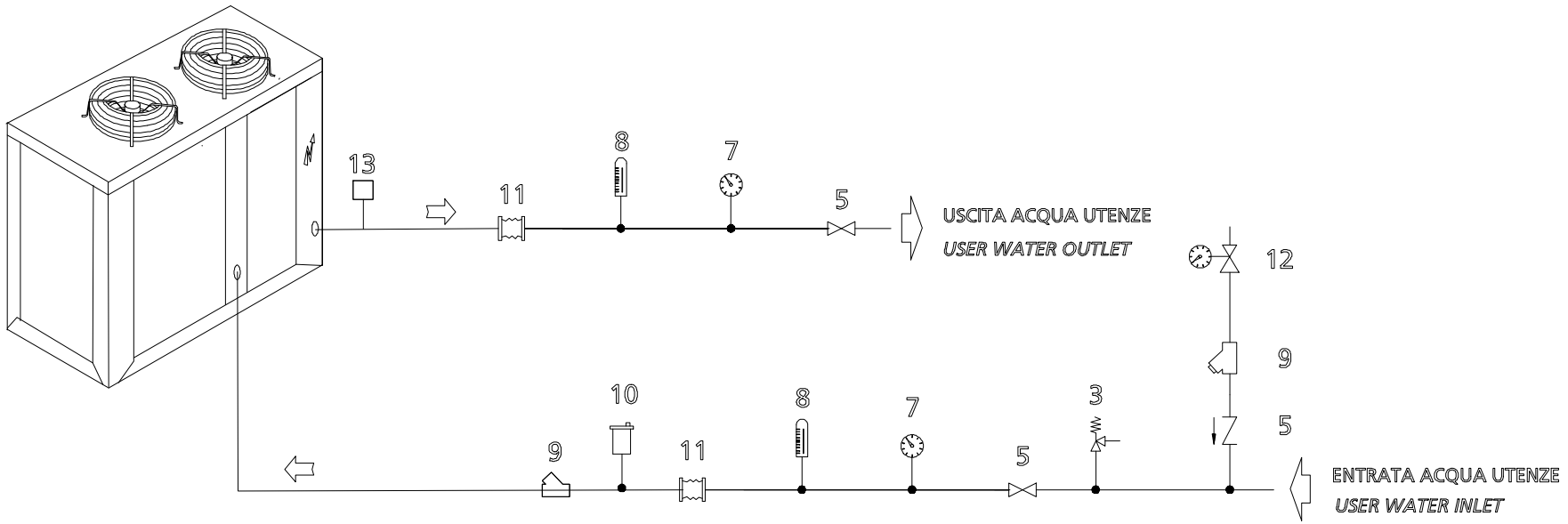
- The following devices should be located on the piping system:
  - isolating/regulating valves, temperature gauges or thermometer pockets, pressure gauges or binder points required for servicing operations.
  - Serviceable mesh strainer, with a filtration level no larger than 1mm, located on the unit inlet to prevent debris from entering the heat exchangers.
  - vent valves, to be installed in the upper parts of the circuit, for air bleeding.
  - expansion device with accessories for circuit pressurisation, water thermal expansion compensation and system filling.
  - unload valve and if necessary drainage tank for circuit emptying during maintenance and seasonal stop.

RECOMMENDED HYDRAULIC CIRCUIT DIAGRAM FOR ZETA 2002 UNITS



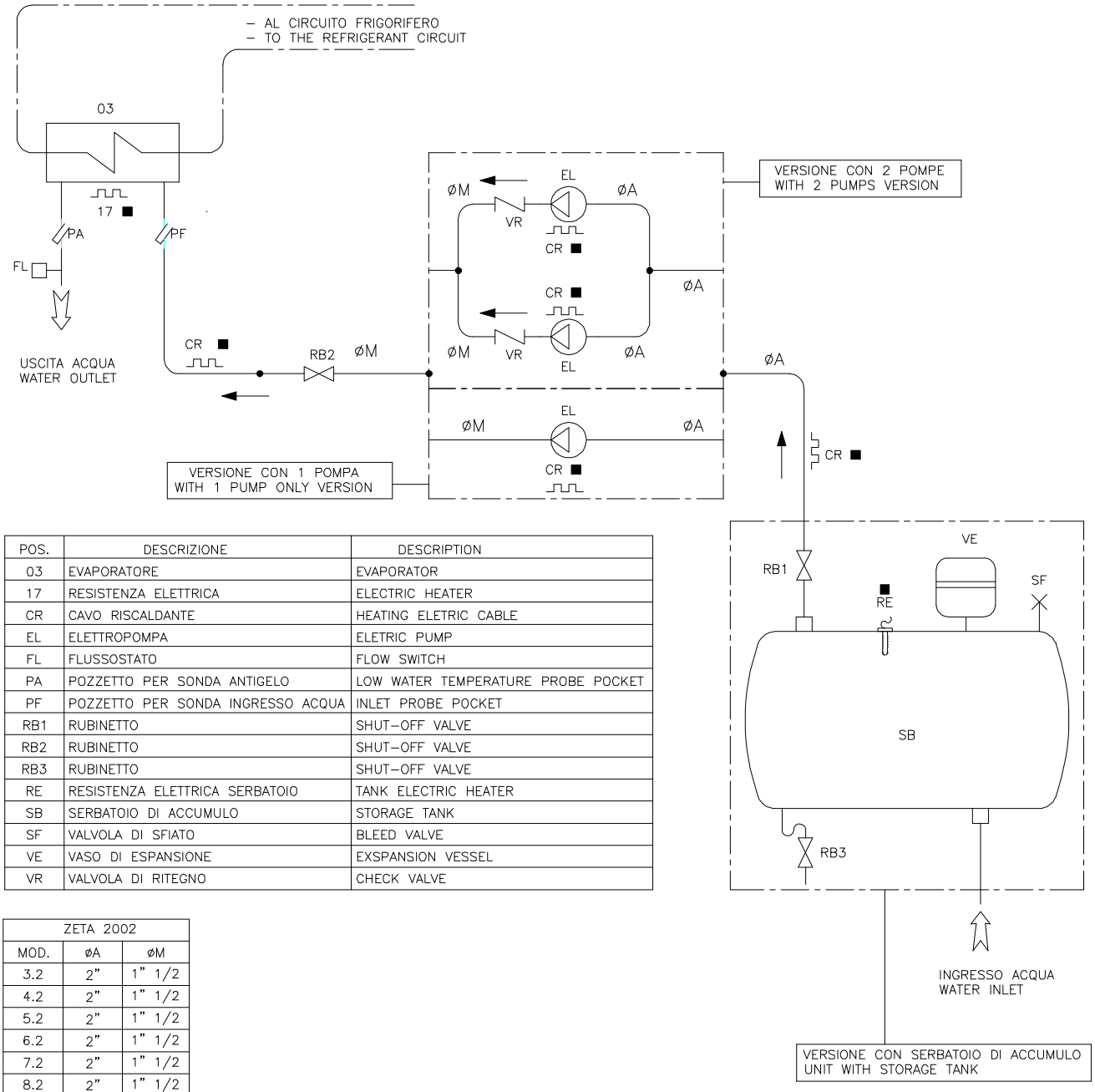
1	Pump	8	Thermometer
2	Expansion tank	9	Water filter
3	Relief valve	10	Bleed valve
4	Check valve	11	Flexible cnnection
5	Ball valve	12	Circuit filling unit
6	Tank	13	Water drain
7	Water pressure gauge	14	Flow switch

RECOMMENDED HYDRAULIC CIRCUIT DIAGRAM FOR MODELS ZETA 2002 / ST 2PS



3	Relief valve	9	Water filter
4	Check valve	10	Bleed valve
5	Ball valve	11	Flexible connection
7	Water pressure gauge	12	Circuit filling unit
8	Thermometer	13	Flow switch

HYDRAULIC CIRCUIT DIAGRAM VERSION ST /2PS



POS.	DESCRIZIONE	DESCRIPTION
03	EVAPORATORE	EVAPORATOR
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
CR	CAVO RISCALDANTE	HEATING ELETRIC CABLE
EL	ELETTROPOMPA	ELETRIC PUMP
FL	FLUSSOSTATO	FLOW SWITCH
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RB1	RUBINETTO	SHUT–OFF VALVE
RB2	RUBINETTO	SHUT–OFF VALVE
RB3	RUBINETTO	SHUT–OFF VALVE
RE	RESISTENZA ELETTRICA SERBATOIO	TANK ELECTRIC HEATER
SB	SERBATOIO DI ACCUMULO	STORAGE TANK
SF	VALVOLA DI SFIATO	BLEED VALVE
VE	VASO DI ESPANSIONE	EXSPANSION VESSEL
VR	VALVOLA DI RITEGNO	CHECK VALVE

ZETA 2002		
MOD.	øA	øM
3.2	2"	1" 1/2
4.2	2"	1" 1/2
5.2	2"	1" 1/2
6.2	2"	1" 1/2
7.2	2"	1" 1/2
8.2	2"	1" 1/2
9.2	2"	2"
10.2	2"	2"
12.2	2"	2"
13.2	2"	2"
14.4	2"1/2	2"
16.4	2"1/2	2"
18.4	2"1/2	2" 1/2
20.4	2"1/2	2" 1/2
24.4	2"1/2	2" 1/2
26.4	2"1/2	2" 1/2

* ø 4" DA VALVOLA DI RITEGNO A RUBINETTO.
* ø 4" FROM CHECK VALVE TO SHOUT–OFF VALVE.

■ OPZIONALE–OPTIONAL

4.4 EVAPORATOR WATER PIPE CONNECTIONS

The water inlet and outlet must be connected in the positions indicated as labelled on the unit.

If incorrectly connected the antifreeze thermostat will not operate and the evaporator may freeze.
The hydraulic connections are threaded. The type and size are indicated on the dimensional drawings at the end of this manual.

A constant water flow to the evaporator must be guaranteed at all operating conditions to prevent liquid refrigerant from entering the compressor and causing irreparable damage.

Compressors start and stop often due to changes in cooling demand. In hydraulic circuits with low water volume, where the thermal inertia action is low, it is advisable to verify that the water volume equals or exceeds the following ratio:

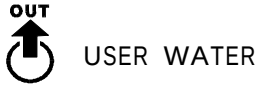
$$M >= \frac{24 \cdot Q_{COMPTOT}}{N}$$

where:

M = system water content [kg]
$Q_{COMPTOT}$ = unit cooling capacity [kW]
N = number of capacity steps

If the water volume does not reach the value given by the formula, it is advisable to provide the circuit with a storage vessel to increase the volume (tank + circuit) to match the result of the formula.
The chilled water piping and storage vessel must be insulated to prevent condensation on the pipe surfaces and to avoid circuit performance losses.

For models from 3.2 to 13.2 it is mandatory to install a flow switch (supplied with the unit) on the evaporator water outlet connection identified by the following decal:



For models from 14.4 to 26.4 the flow switch is already installed as part of the standard equipment.

All units are equipped with plate heat exchangers. It is compulsory to install a metallic filter, on the water inlet piping, with a mesh not larger than 1 mm. If a filter is not installed the warranty will be terminated immediately.

We strongly recommend installing a pressure relief valve on the hydraulic circuit. In the event of serious system breakdown or emergency (e.g. fire), the relief valve will make it possible to depressurise the system thus forestalling possible pipe bursts. Always connect the relief valve outlet to a pipe of diameter no smaller than the valve opening, and route it to a location in which persons are protected from the jet of expelled water.

Caution: When making hydraulic connections never use naked flames close to or inside the unit.

4.5 WATER FLOW SWITCH INSTALLATION INSTRUCTIONS (models 3.2 to 13.2)

- Clean the pipeline system into which the flow switch is to be fitted and take away any magnetic particle, such as welding residues. To prevent turbulent flow there must be straight pipework, equal to 5 times the diameter of the pipe, either side of the flow switch.

" Connect the "T" shaped metallic manifold (on which the flow switch is mounted) into the evaporator male threaded water outlet labelled with:

OUT

USER WATER

To avoid leakage, seal the connection by using teflon. The flow switch should be installed on the heat exchanger that is closer to the electrical board.

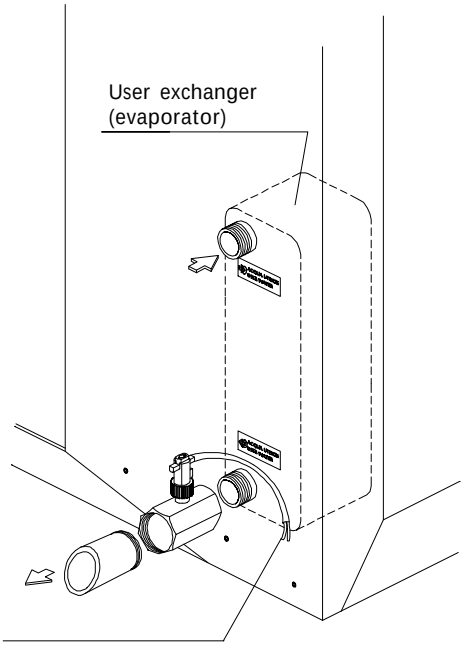


Figure 7

- The flow switch must be tightened on the "T" shaped metallic manifold by the plastic knurled union nut. Check that the arrow located on the upper side is pointing in the direction of flow.Be sure to fit the O-ring seal, through the brass manifold and the plastic ring nut. The O-ring seal is supplied in a plastic cover to protect the flow switch shaft.

- Connect the flow switch to the other end of the "T" manifold.

- Route the flow switch electrical cable through the hole in the unit structure and run it to the electrical panel by ascending the upright in the machine interior. Connect the flow switch to terminals 1-14 as indicated on the electrical drawing.

- The flow switch can be removed by screwing out the plastic knurled union nut. In order to reassemble it, ensure that the o-ring seal is positioned in the proper location. (See figure10).

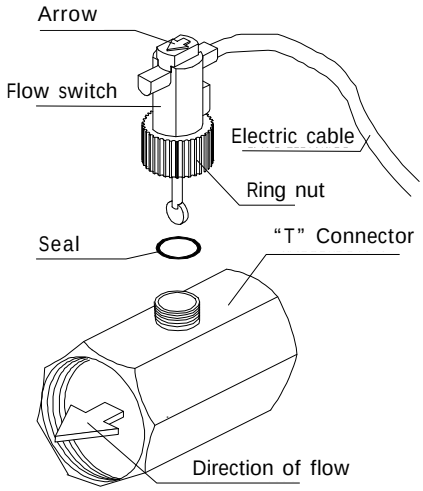


Figure 8

4.6 DESUPERHEATER HYDRAULIC CONNECTION (optional)

For all units equipped with desuperheaters the connections, for the relative hydraulic circuit, are steel tubes with male threads.
The water inlet and outlet must be connected in the positions indicated as labelled on the unit.

Heat recovery water inlet: 

WATER DESUPERHEATER

Heat recovery water outlet: 

WATER DESUPERHEATER

On HP version units the hydraulic connection to the desuperheater must be isolated during heat pump operation

4.7 ZETA 2002/DC HEAT RECOVERY EXCHANGER HYDRAULIC CONNECTIONS

For all units equipped with a recovery condenser, the relative hydraulic circuit connections are male threaded steel pipes (the diameter depends on the unit's size)
The units are equipped with a probe that monitors the temperature of the water returning from the system. The microprocessor controller enables recovery when necessary, disconnecting the fans, and restarting regular operation once the water has reached the desired temperature.
If faults occur on the recovery condenser the microprocessor controller restarts the fans.
The calibration values of the thermostat and pressure switches are given in the relevant controller instruction manual.

For units equipped with a recovery condenser:

The water inlet and outlet must be connected in the positions indicated as labelled on the unit.

IN RECOVERY WATER OUT

It is mandatory to install a three-way modulating, valve with water temperature probe, on the inlet to the unit to ensure that, at steady state conditions, the inlet water temperature is not less than 20 °C.

DIAGRAM WITH 3-WAY VALVE

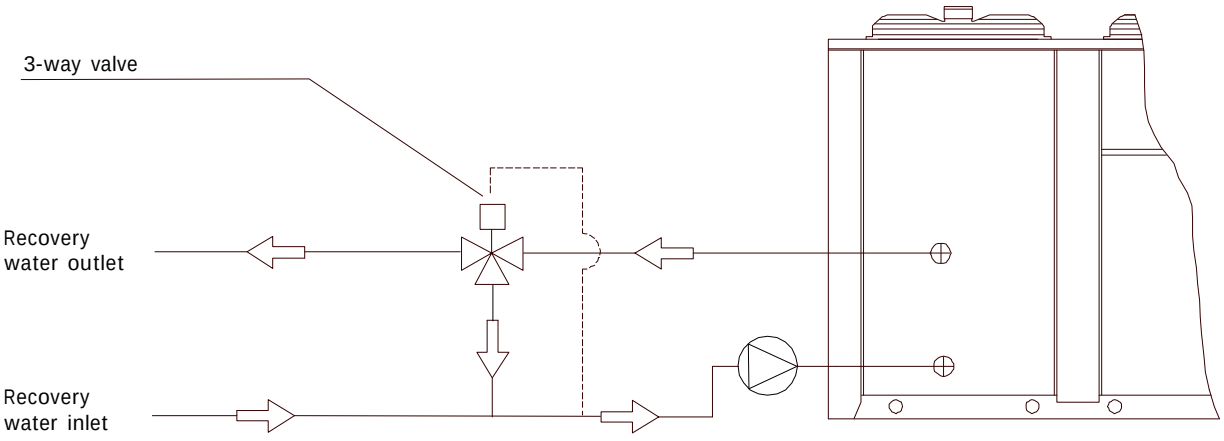


Figure 9

Alternatively: a condensing pressure control valve for each refrigerant circuit that ensures an average condensing temperature of at least 33 °C.

DIAGRAM WITH CONDENSING PRESSURE CONTROL VALVE

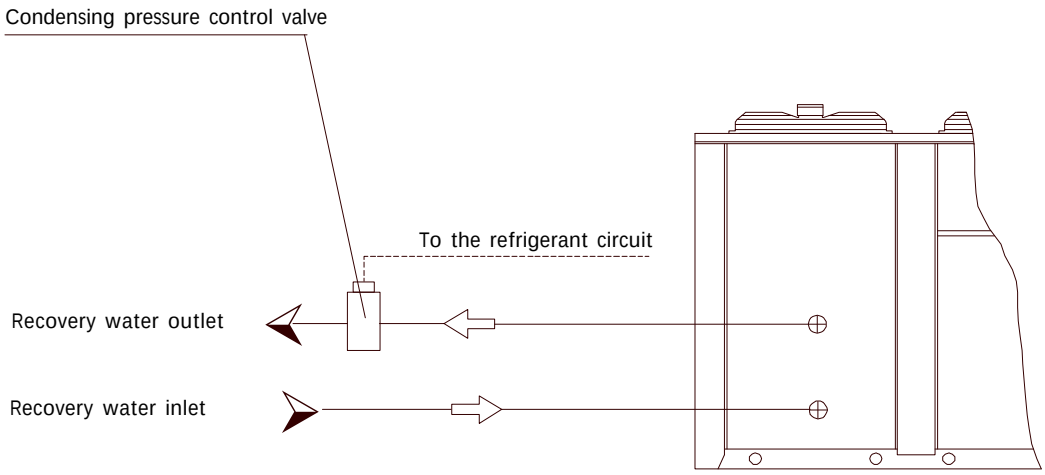


Figure 10

This method ensures that the recovery unit is supplied with a flow that increases as the water temperature rises, thus allowing the system to operating with optimum functional parameters at all times.

4.8 PRESSURE RELIEF VALVES

Pressure relief valves are fitted on the high pressure side and low pressure side of the refrigerant circuit. The valves must be vented, to outdoors, through a vent pipe.
The vent pipe must be sized no smaller than the relief valve and it must not be supported from the valve.

Caution: The relief valve must be directed into a safe zone where no injuries can be caused to people.

4.9 CONNECTIONS FOR VERSION /LE (MOTOCONDENSING UNIT)

/LE (condensing unit) versions must be connected to a remote evaporator by means of refrigerant lines.
For separate section type /LE versions, the route followed by refrigerant lines depends on the location of the sections and the characteristics of the surrounding building structure.
Pipe runs should be as short as possible to limit the pressure drop and the refrigerant charge volume. The maximum permissible pipeline length is 30 metres.
If this limits cannot be adhered to contact Blue Box for further information.

4.9.1 Procedures to follow when sizing refrigerant lines

Depending on the relative position of the sections, there are certain procedures to follow when installing the refrigerant line.

4.9.2 Evaporating section at lower level than condensing section:

a) The vertical riser must be equipped with siphons at least every 6 metres to facilitate the return of oil to the compressor;

b) Make a collection pit on the suction line downstream of the thermostatic valve bulb;

c) Horizontal sections of the suction line should follow a grade of at least 1% to facilitate oil return to the compressor (see above).

The diameter of pipes can be obtained from table 1, according to the selected model and length of connecting pipes.

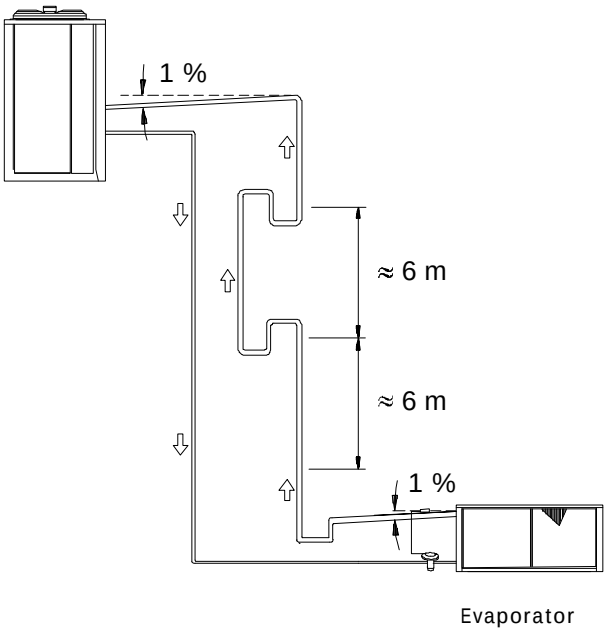


Figure 11

4.9.3 Evaporating section positioned higher than the condensing unit section:

a) Form a siphon on the suction line,at the same height as the evaporator, to avoid drainage of liquid towards the compressor when the unit is stopped.

b) Make a collection pit on the suction line, downstream from the thermostatic valve bulb, for the collection of liquid refrigerant that can accumulate during unit shutdown. When the compressor restarts the refrigerant will evaporate rapidly: it is advisable to create the accumulation pit well away from the bulb to avoid the risk of affecting the operation of the thermostatic valve.

c) Horizontal sections of the suction line should follow a grade of at least 1% to facilitate oil return to the compressor.

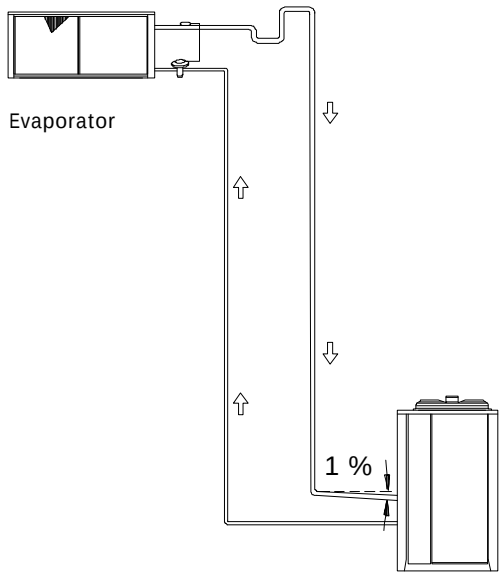


Figure 12

TABLE 1 - EXTERNAL PIPE DIAMENTERS FOR /LE VERSIONS

Distance [m]	10		20		30	
MODEL ZETA 2002	Suction [mm]	Liquid [mm]	Suction [mm]	Liquid [mm]	Suction [mm]	Liquid [mm]
3.2	35	18	35	18	35	18
4.2	35	22	42	22	42	22
5.2	35	22	42	22	42	22
6.2	42	22	42	22	42	22
7.2	42	28	42	28	54	28
8.2	42	28	42	28	54	28
9.2	54	28	54	28	54	28
10.2	54	28	54	28	54	28
12.2	54	35	54	35	54	35
13.2	54	35	67	35	67	35
14.4	42	28	42	28	54	28
16.4	42	28	42	28	54	28
18.4	54	28	54	28	54	28
20.4	54	28	54	28	54	28
24.4	54	35	54	35	67	35
26.4	54	35	67	35	67	35

4.10 WATER FLOW RATE TO EVAPORATOR

The nominal water flow rate is based on a 5 °C temperature difference between inlet and outlet in relation to the supplied cooling capacity.

The maximum permissible flow rate is that which results in a temperature difference of 3 °C: higher flow rates will lead to excessive pressure drops and could damage the evaporator.

The minimum permissible flow rate is that which results in a temperature difference of 8 °C or a pressure drop of no less than 10 kPa: lower flow rates will lead to excessively low evaporation temperatures with consequent tripping of safety devices and shutdown of the unit.

4.11 CHILLER WATER TEMPERATURE (summer cycle)

For the minimum water temperature at the evaporator outlet refer to section 4.14.
The maximum water temperature at the evaporator inlet is 20 °C. In the case of higher temperatures specific solutions are necessary (dual circuits, three-way valves, by-pass, storage tanks): consult the Bluebox Engineering Department to discuss the most suitable solution for your application.

4.12 HOT WATER TEMPERATURE (winter cycle)

The minimum water temperature at the condenser inlet, once the system is operating in steady state conditions, must be no lower than 23 °C: lower values could result in operating anomalies of the compressor with the consequent risk of compressor breakdown.
The maximum water temperature at the condenser outlet must be no higher than 48 °C. In the event of higher temperatures the safety devices will trip causing the unit to shut down.

Warning: speed control calibration settings must not be altered. If it proves necessary to alter speed calibration settings, this task must be entrusted to a skilled engineer, who should refer to the attached instruction sheet.

4.13 Ambient air temperature

- The units are designed and built to operate with ambient air temperatures within the limits shown on the operating limits diagrams. Contact Bluebox if the unit is required to operate at different ambient temperatures.
- It should be noted that the performance of heat pump units decreases significantly at lower ambient temperatures.
- The units can be optionally equipped with an electric element for heating the evaporator. The heater cuts in, when the machine is switched off, if the water temperature in the evaporator falls below the freeze protection calibration temperature.

4.14 FAN SPEED CONTROL (optional)

If the unit is required to operate at ambient air temperatures less than 18 °C a fan speed controller must be included. With fan speed control the unit can function correctly, at low ambient temperatures, by reducing the air flow supplied to the condenser so that it operates within acceptable parameters.
This control is calibrated and tested in the factory.

4.15 OPERATION WITH LOW TEMPERATURE CHILLED WATER AT EVAPORATOR

Units from the normal production range are not designed to operate with lower chilled water temperatures, at the evaporator outlet, than those indicated in the operating limit diagrams. To operate outside this limit the unit may require structural modifications. If this should become necessary Bluebox.

With temperatures lower than those shown in the operating limit diagrams, the hydraulic circuit should be filled with a suitable water and antifreeze solution. In such cases the service thermostat and the freeze protection thermostat must be reset:

These calibrations are normally set in the factory.

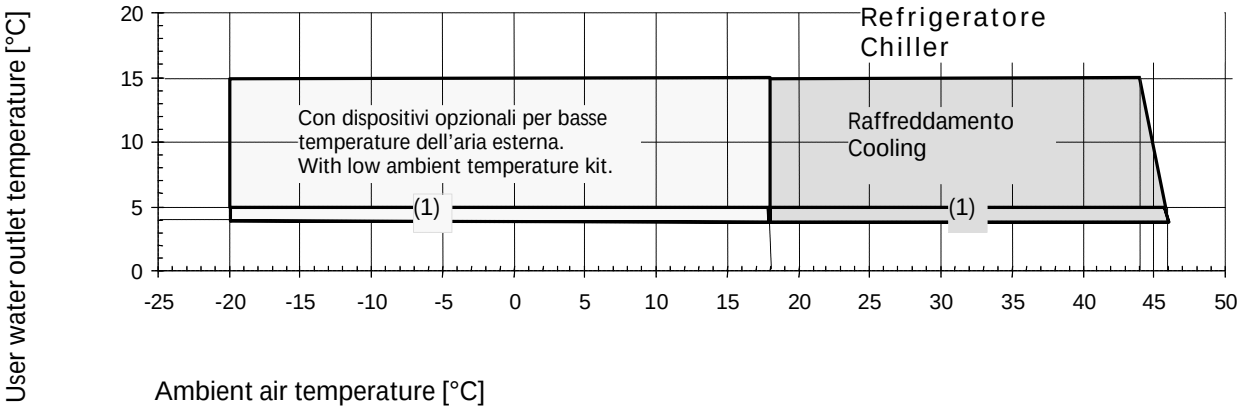
The ethylene glycol percentage must be selected in relation to the required chilled water temperature. See Table 2.

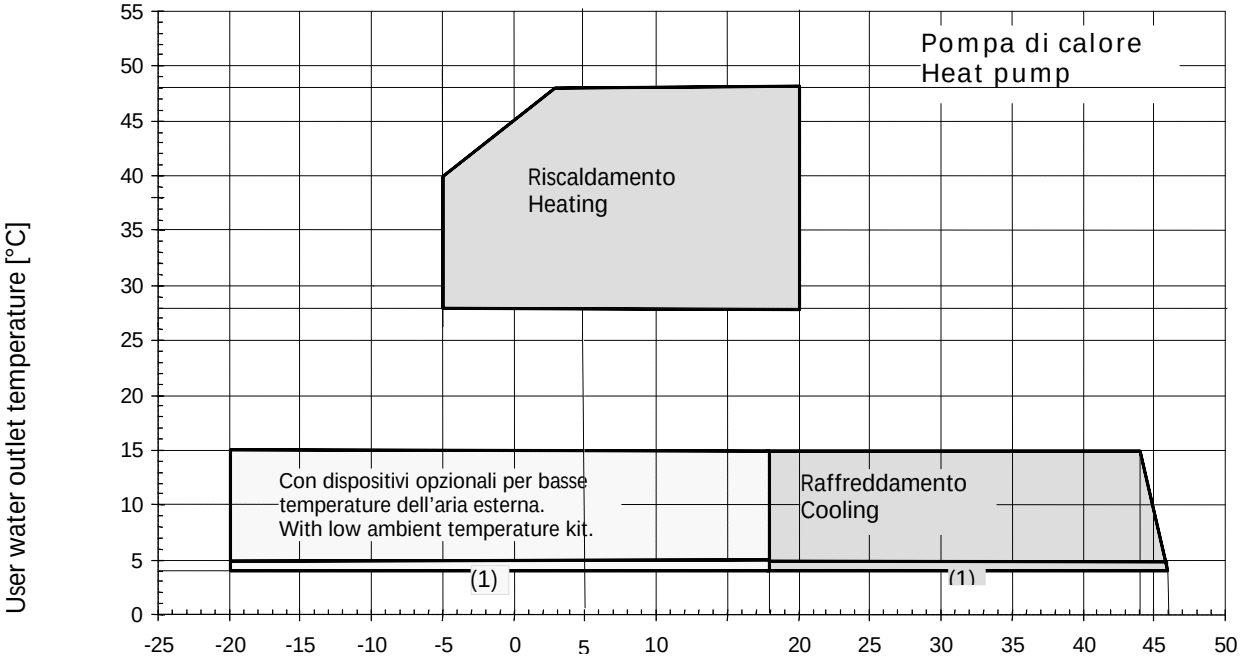
TABLE 2 - FREEZING POINT FOR WATER-ANTIFREEZE MIXTURES

LIQUID OUTLET TEMPERATURE OR MINIMUM AMBIENT TEMPERATURE (°C)	+0°	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°
FREEZING POINT (°C)	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°	-45°
ANTIFREEZE	% BY WEIGHT								
ETHYLENE GLYCOL	6	22	30	36	41	46	50	53	56
PROPYLENE GLYCOL	15	25	33	39	44	48	51	54	57
METHANOL	8	14	20	26	30	34	38	41	45
CALCIUM CHLORIDE	9	14	18	21	24	26	27	28	30
TEMPER -20	T -20°C					---			
TEMPER -40	T -40°C								---
TEMPER -60	T -60°C								
TIFOXITE	40			50	60	63	69	73	---
FREEZIUM	10	20	25	30	34	37	40	43	45
PEKASOL 50	50		59	68	75	81	86	90	---

In the case of ST versions with a glycol content greater than 30% pumps with special seals must be specified at the time of the order.

OPERATING LIMITS
ZETA 2002 - R22 refrigerant

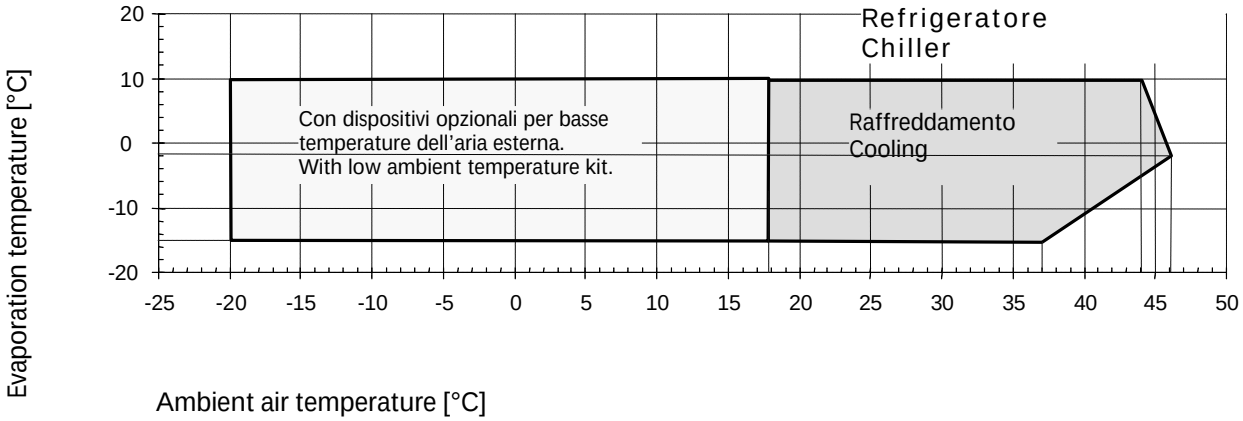


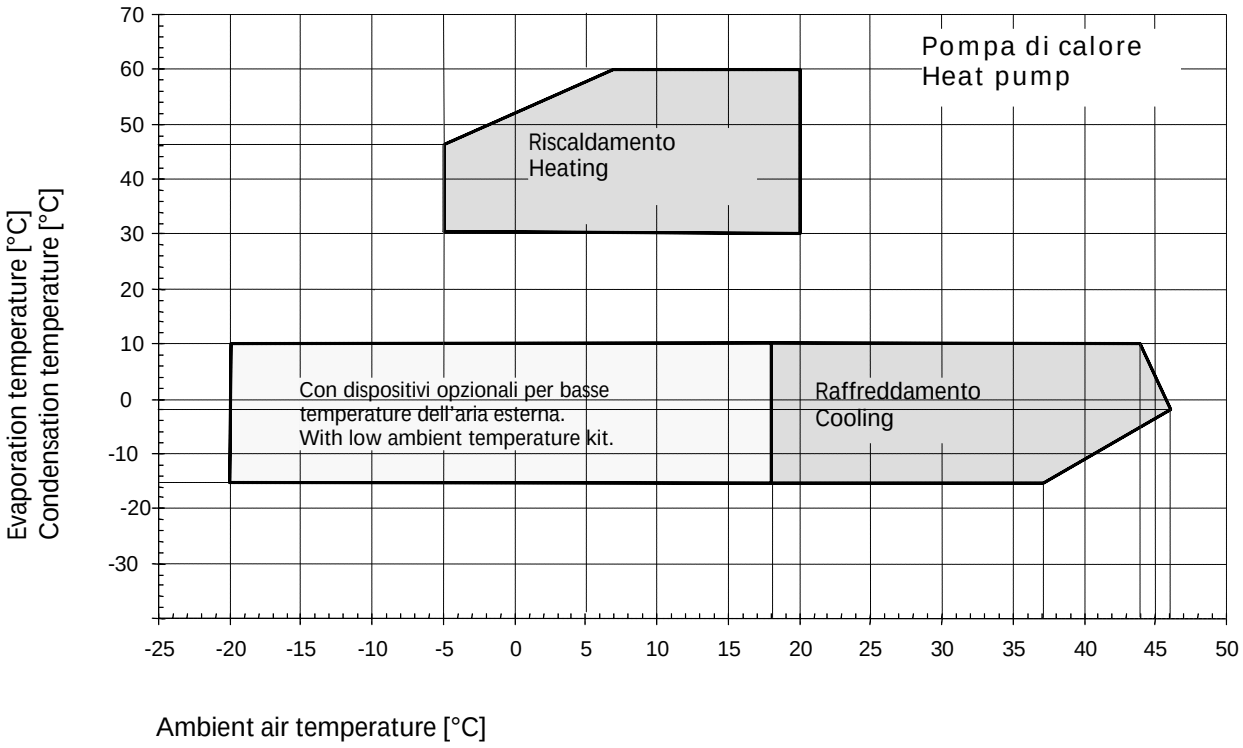


The water temperature rise for all versions must be between 3 °C (min) and 8 °C (max)

(1) Working limits of units with 2 compressors

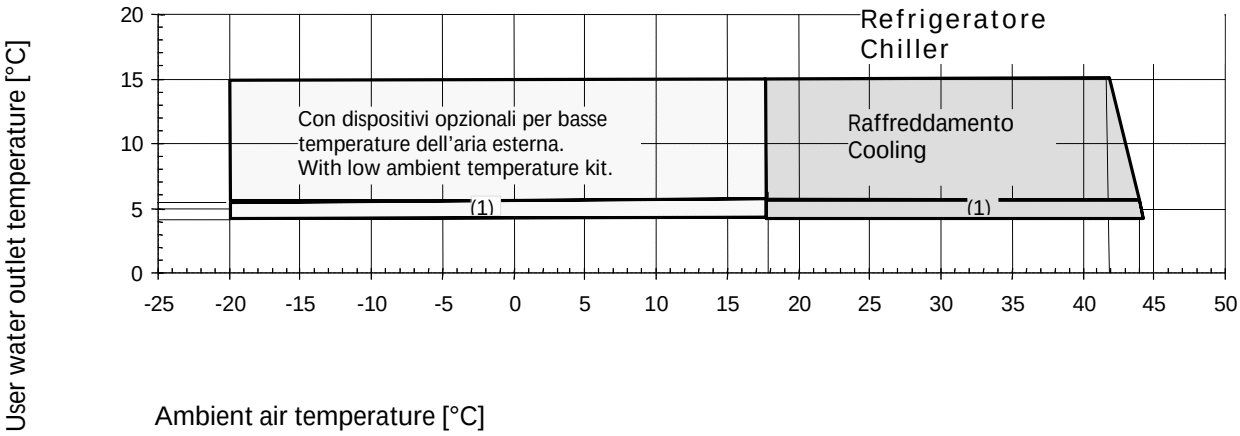
OPERATING LIMITS
ZETA 2002/LE - R22 refrigerant

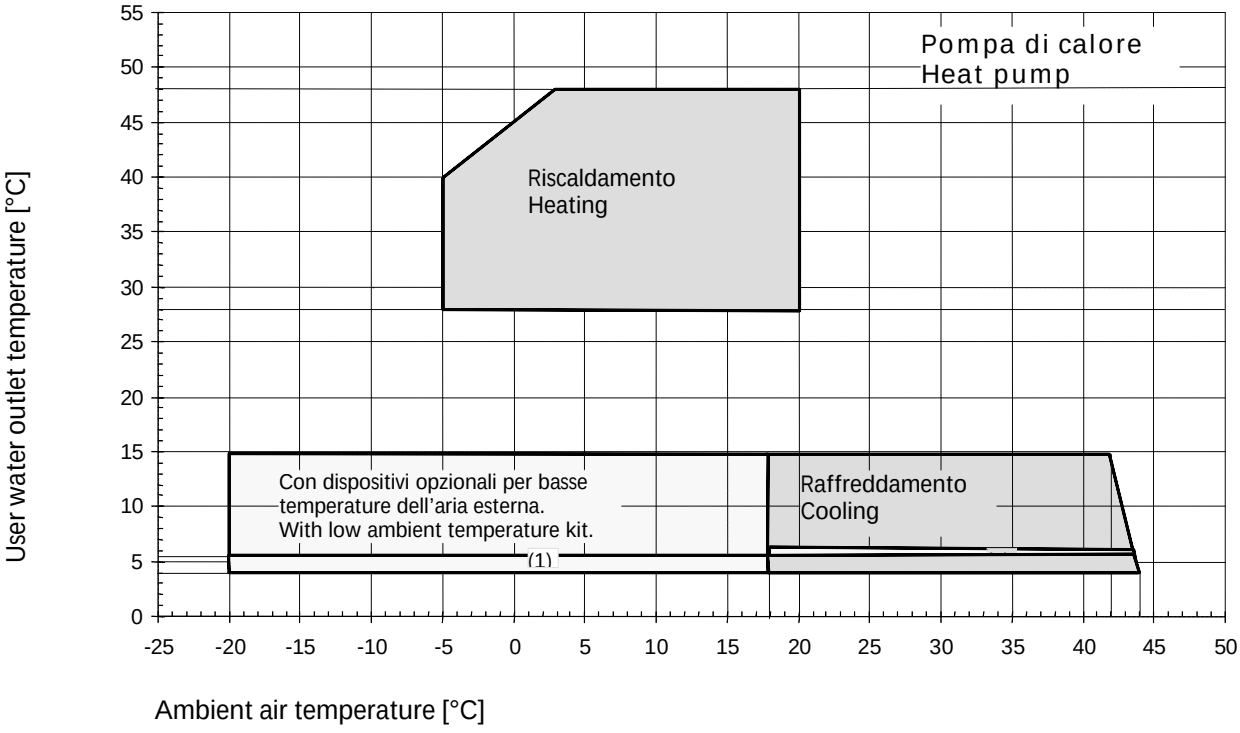




The water temperature rise for all versions must be between 3 °C (min) and 8 °C (max)

OPERATING LIMITS
ZETA 2002 - R407C refrigerant

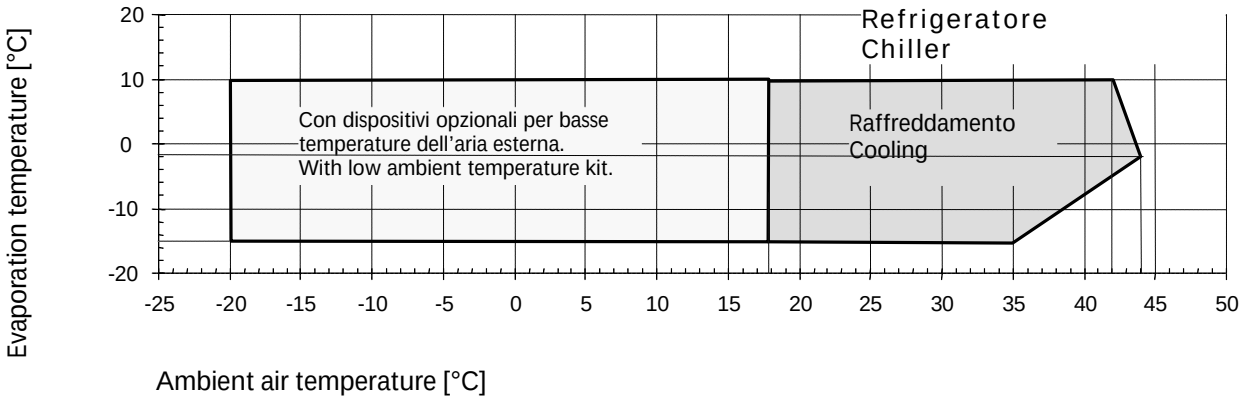


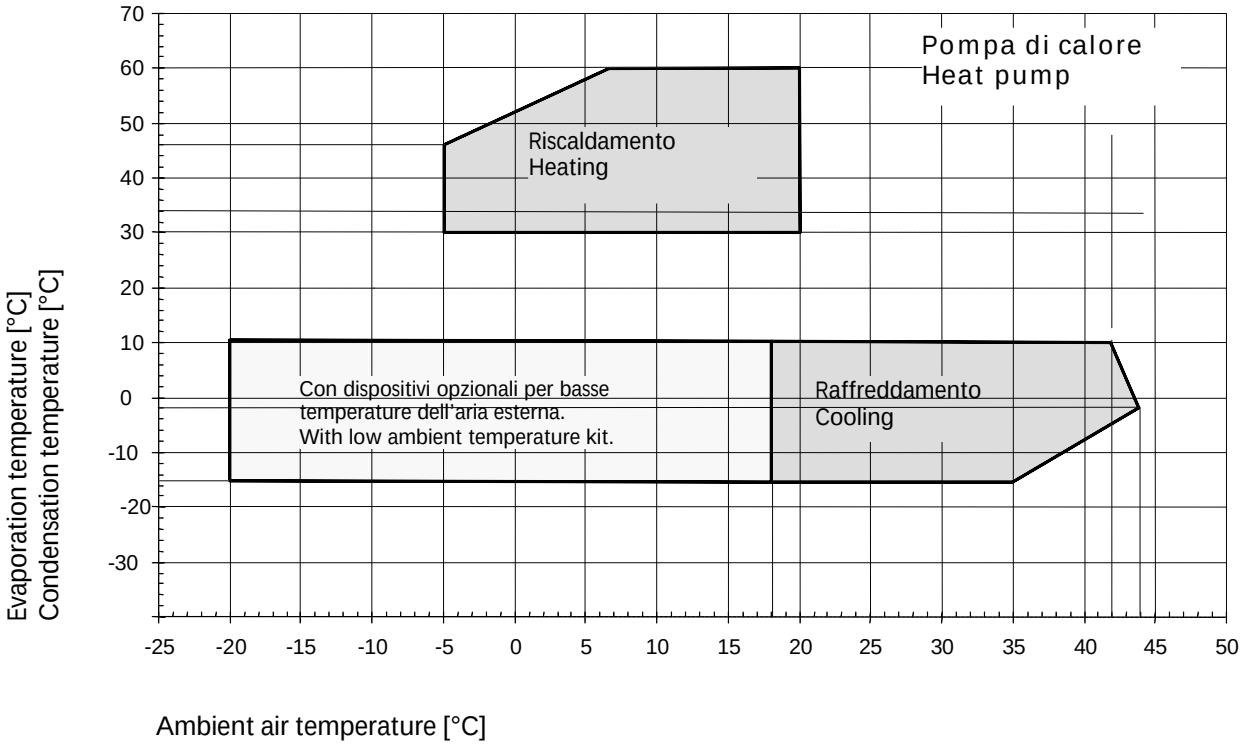


The water temperature rise for all versions must be between 3 °C (min) and 8 °C (max)

(1) Working limits of units with 2 compressors

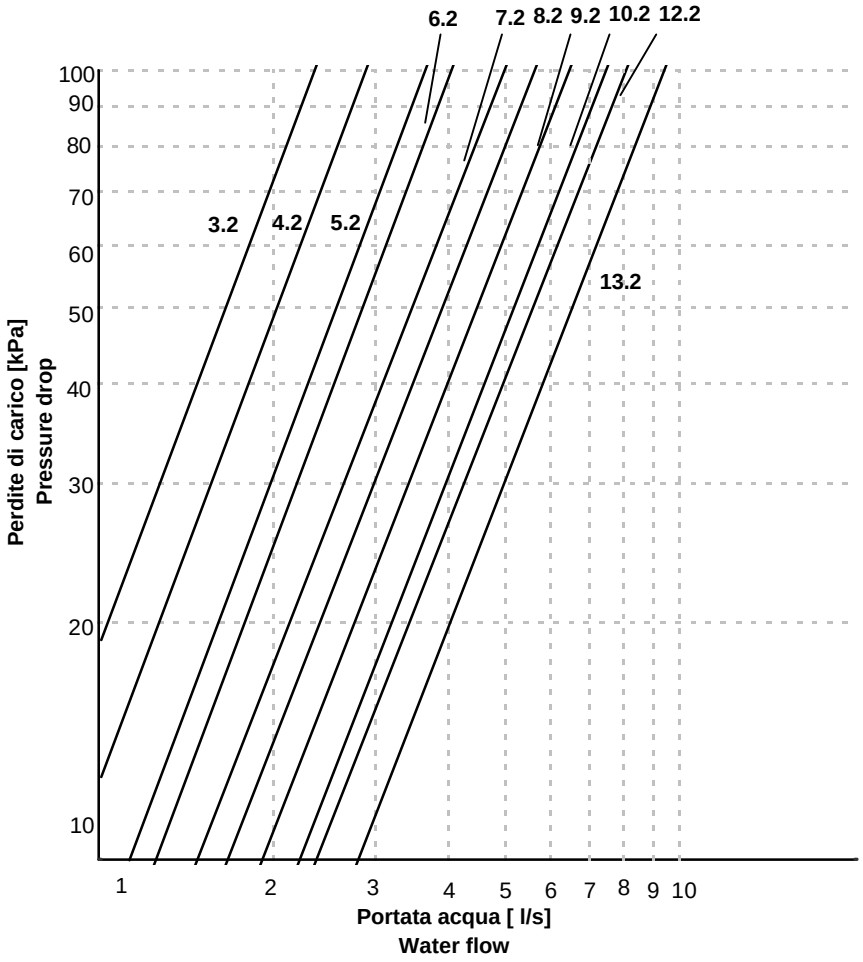
OPERATING LIMITS
ZETA 2002/LE - R407C refrigerant

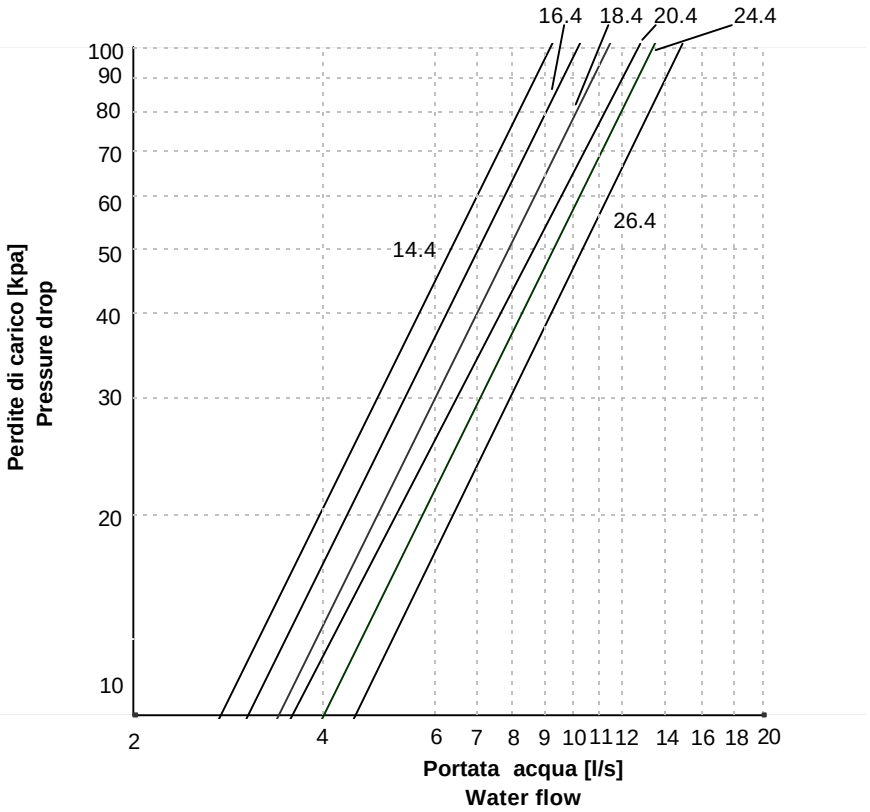




The water temperature rise for all versions must be between 3 °C (min) and 8 °C (max)

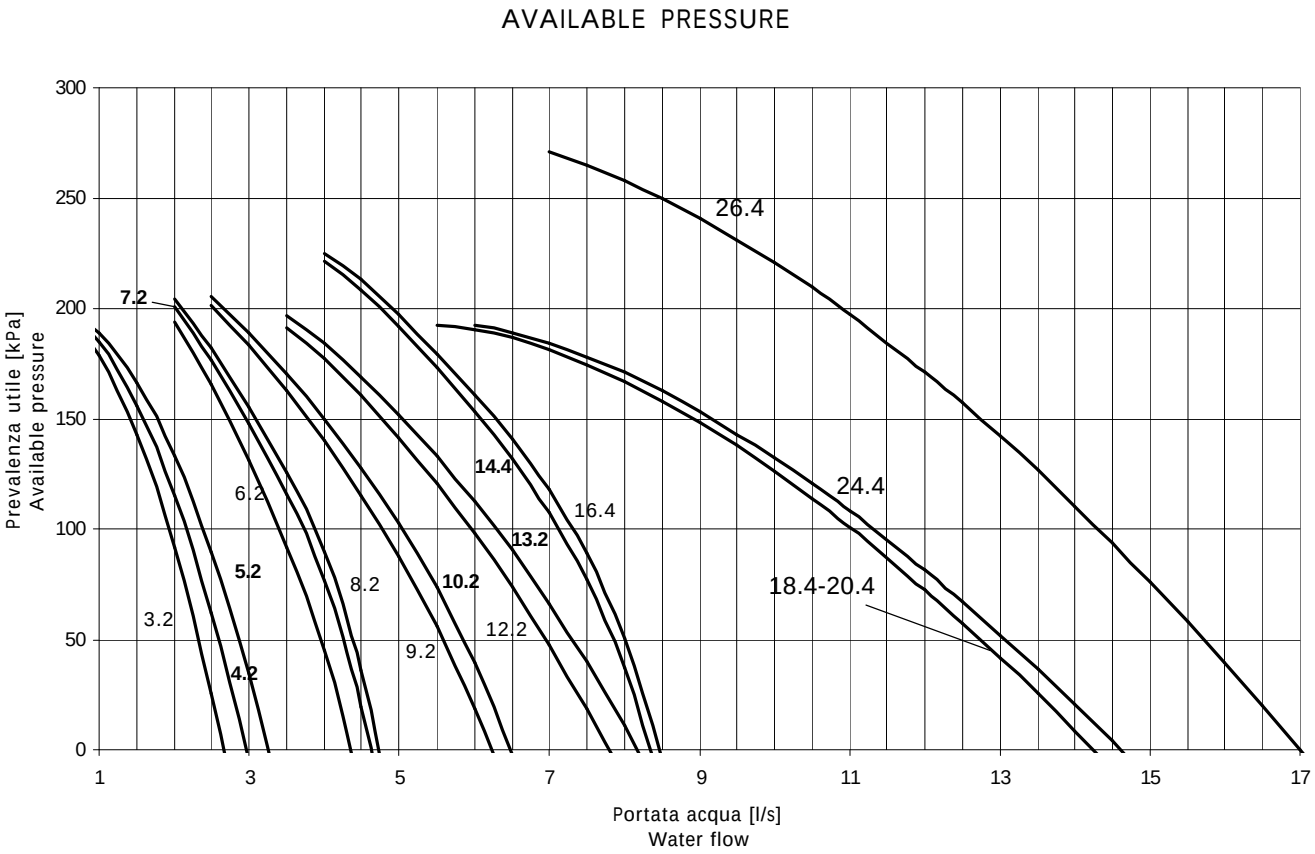
EVAPORATOR PRESSURE DROP





The water temperature rise for all versions must be between 3 °C (min) and 8 °C (max)

PUMPS AVAILABLE PRESSURE - MODEL ZETA 2002 /ST 2PS



4.16 ELECTRICAL CONNECTIONS

4.16.1 General

Electrical connections must be made in accordance with the information given on the electrical drawing attached to the unit and in compliance with the applicable local regulations.

An Earth (ground) connection is compulsory. The installer must connect the earth cable with a dedicated terminal on the earth bar in the electrical board (refer to the illustration on the following page) labelled PE.

It must be verified that the electrical supply corresponds to the unit electrical nominal data (tension, phases, frequency) indicated on the label on the front panel of the unit.

Line voltage fluctuations must not be more than ±5% of the nominal value, while the voltage unbalance between one phase and another must not exceed 2%. If these tolerances are not possible contact Blue Box to provide the necessary devices.

Check that the line is connected with the correct phase sequence.

The cable inlet point is created by drilling a hole in the side or base of the electrical enclosure, depending on the model.

The control circuit is derived from the power supply through a transformer located inside the electrical panel.

The control circuit is protected by fuses.

Electrical cable anchorage: anchor the electrical power cables with fixing systems able to withstand pulling and torsional stress.

Before any operation on the electrical section, be sure that the electric supply is disconnected.

Power cable and line protection must be sized according to the specification indicated on the wiring diagram and the documents supplied with the unit.

The crankcase heaters must be connected at least 12 hours before starting the unit; the heaters are automatically connected when the main disconnect switch is set to the ON position.

The electrical supply must be within the limits shown. If this is not the case the warranty will be terminated immediately.

4.16.2 Power supply to crankcase heaters

1) Close the main disconnect switch by turning it from position "0" to position "1"
2) Check that the word "OFF" is shown on the display
3) Ensure that the unit is in "OFF" status and that the external enabling contact is open
4) After a few moments, if the phase sequence is incorrect the alarm "INCORRECT PHASE SEQUENCE" will be displayed (4-compressor models from 14.4 to 26.4 only, with pCO2 controller). In this case invert the connections of two of the power line phase wires.
5) Leave the unit in this condition for at least 12 hours to allow the crankcase heaters to perform their function

4.16.3 Potential free contacts

The following potential free contacts are available:
- 1 potential free contact for general alarm (terminals 100 - 101 - 102)
- 1 potential free contact for each compressor (option)
- 1 contact for each pair of fans (option)
- 1 contact for each pump (option - ST models)

4.16.4 Flow switch electrical connections

Flow switch electrical connections (see paragraph 4.4) must be connected to terminal 1-14 for chiller units.

4.16.5 Circulating pump electrical connections

The external interlocks of unit must close for the unit to operate. The normally open external water circulating pump contactor terminals must be wired in series with terminals 1 and 2, on the unit control panel, to ensure that the chiller can only start after the pump is in operation.
In ST units external enabling contacts 1-2 must be jumpered (unless they are required for system functions).

Turn on the pump before the unit starts and stop it after the unit has stopped (recommended time delay: 60 sec.).

4.17 MICROPROCESSOR CONTROLLERS

Chillers in the ZETA 2002 series with 2 scroll compressors, models from 3.2 to 13.2, are equipped with the mCHILLER type microprocessor controller.

Chillers in the ZETA 2002 series with 4 scroll compressors, models from 14.4 to 26.4, are equipped with the pCO2 microprocessor controller.

4.17.1 Microprocessor controller for /LE and HP/LE versions

- Versions ZETA 2002 /LE and ZETA 2002 HP/LE with two compressors are equipped with an **m**chiller controller.

- Versions ZETA 2002 /LE and ZETA 2002 HP/LE with four compressors do not have an integral controller and therefore an external controller, or thermostats, must be connected to the auxiliary terminals 1-21, 1-31, 1-41 and 1-51.

Consult the electrical diagram attached to the unit.

4.17.2 RS485 serial interface (optional)

All units can be equipped with a serial interface board for supervision or remote diagnostics functions by means of a computer.

The serial interface board plugs into a dedicated slot on the connection board.
Connection to the supervision or remote diagnostics serial line is executed in compliance with standard RS485 and is achieved by means of the serial interface boards.

Models from 3.2 to 13.2 with two scroll compressors and mchiller controller

When the serial interface board is inserted the Carel communications protocol is available.
A conversion gateway is required for the Modbus-jbus and BacNet protocols.

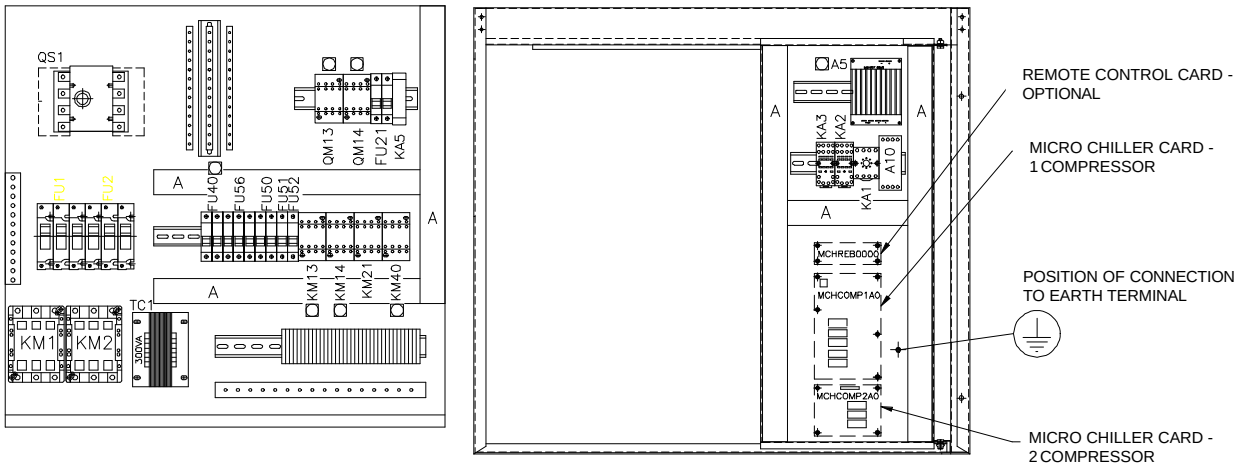
Models from 14.4 to 26.4 with 4 scroll compressors and pCO² controller

When the serial interface board is inserted the following communications protocols are available: Carel, Modbus-jbus, BacNet. If a connection is to be made with networks that utilise the Lon-Talk protocol, a dedicated board must be installed.
In this case, a conversion gateway is not required.

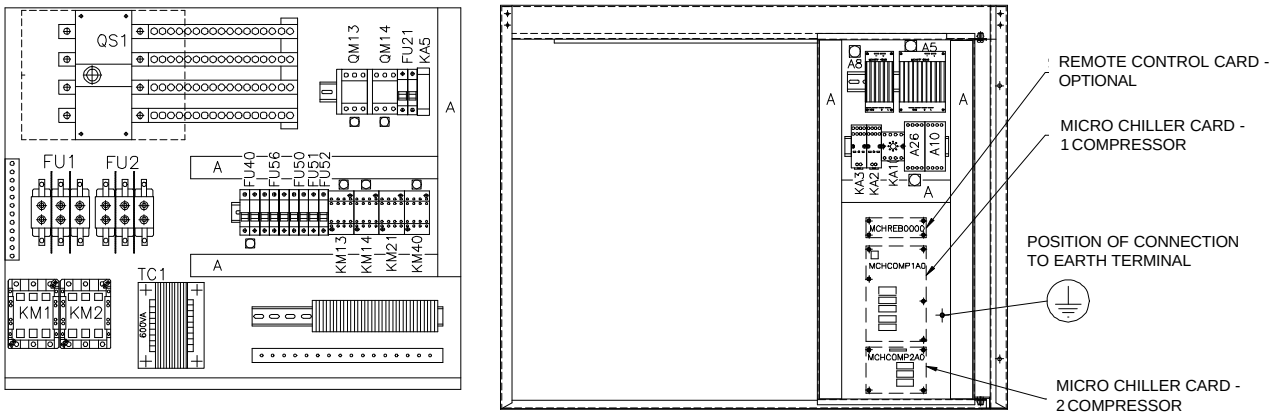
ELECTRICAL PANEL LAY OUT

Unit with 2 compressors - mchiller controller

ZETA 2002 - Models 3.2 - 8.2



ZETA 2002 - Models 9.2 - 13.2



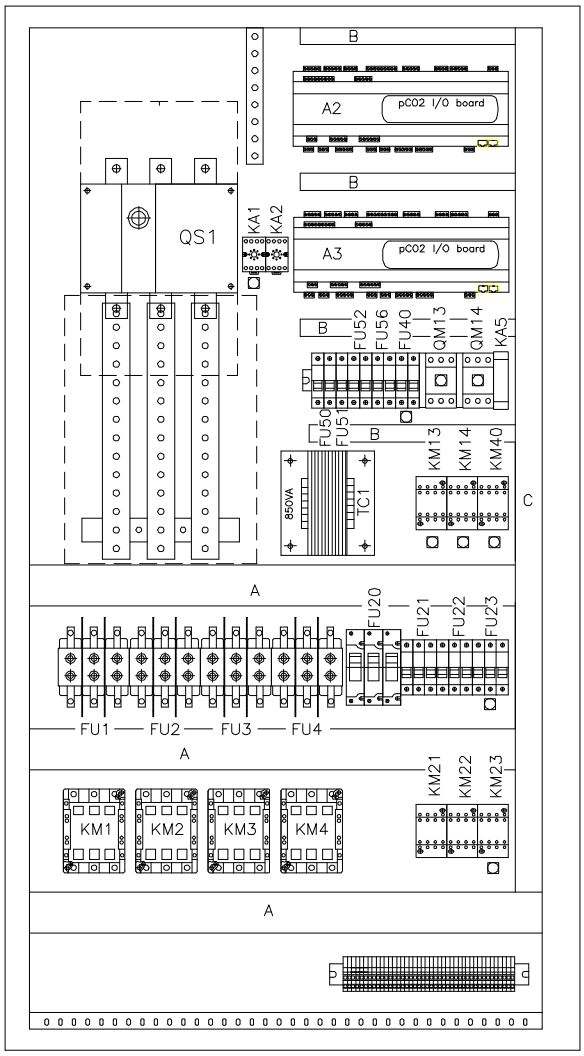
KEY TO ELECTRICAL COMPONENT PART NUMBERS

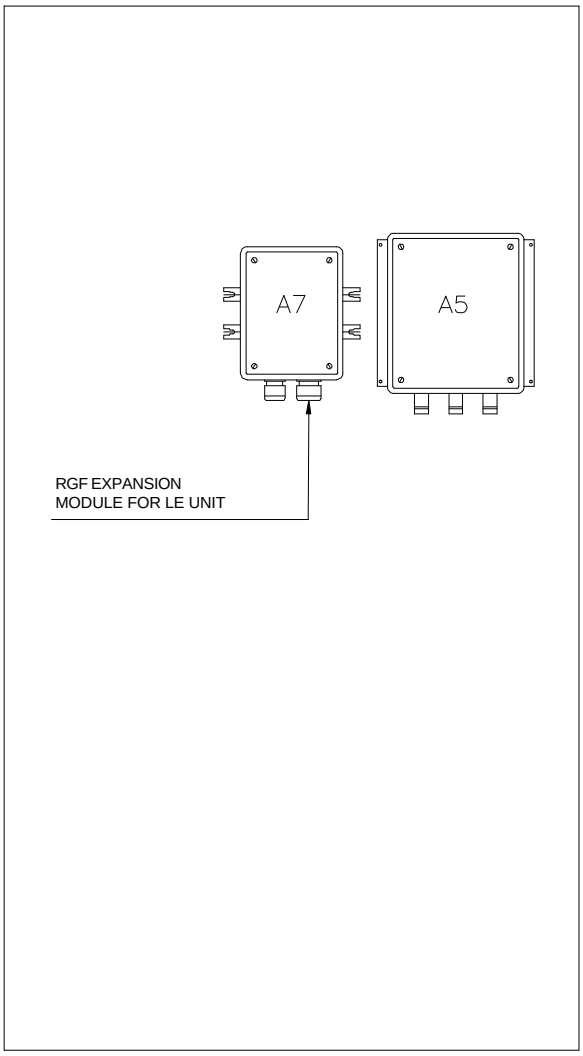
A10	ON/OFF CONTROL CIRCUIT BOARD
A5	SPEED REGULATOR
A8	SPEED REGULATOR
FU1	COMPRESSOR 1 FUSES
FU2	COMPRESSOR 2 FUSES
FU21	FAN UNIT FUSES
FU21	FAN UNIT FUSES
FU40	HEATER FUSES
FU50	AUXILIARY TRANSFORMER FUSES
FU51	CONTROL CIRCUITS FUSE
FU52	CONTROLLER FUSE
FU56	PHASE SEQUENCE RELAY FUSES
KA1	POWER “ON” RELAY
KA2	FAN UNIT ALARMS RELAY
KA3	HP RELAY
KA5	PHASE SEQUENCE RELAY
KM1	COMPRESSOR 1 CONTACTOR
KM13	PUMP 1 CONTACTOR
KM14	PUMP 2 CONTACTOR
KM2	COMPRESSOR 2 CONTACTOR
KM21	FAN UNITS CONTACTOR
KM40	EVAPORATOR HEATER CONTACTOR
QM13	PUMP 1 MOTOR OVERLOAD CUT-OUT
QM14	PUMP 2 MOTOR OVERLOAD CUT-OUT
QS1	MAIN POWER DISCONNECT SWITCH
TC1	CONTROL CIRCUITS TRANSFORMER

ELECTRICAL PANEL LAY OUT

Unit with 4 compressors - pCO² controller

ZETA 2002 - Models 14.4 - 26.4





KEY TO ELECTRICAL COMPONENT PART NUMBERS

A2	CONTROL BOARD
A3	2-COMPRESSOR EXPANSION BOARD
A5	SPEED REGULATOR
A7	RGF EXPANSION MODULE, UNIT /LE
FU1	COMPRESSOR 1 FUSES
FU2	COMPRESSOR 2 FUSES
FU20	RGF FUSES
FU21	FAN UNIT FUSES
FU22	FUSES - FAN UNITS 2
FU23	FUSES - FAN UNITS 3
FU3	FUSES - COMPRESSOR 3
FU4	FUSES - COMPRESSOR 4
FU40	FUSES- HEATERS
FU50	FUSES - AUXILIARY TRANSFORMER
FU51	CONTROL CIRCUITS FUSE
FU52	CONTROLLER FUSE
FU56	PHASE SEQUENCE RELAY FUSES
KA1	POWER "ON" RELAY
KA2	FAN UNIT ALARMS RELAY
KA5	PHASE SEQUENCE RELAY
KM1	COMPRESSOR 1 CONTACTOR
KM13	PUMP 1 CONTACTOR
KM14	PUMP 2 CONTACTOR
KM2	COMPRESSOR 2 CONTACTOR
KM21	FAN UNITS CONTACTOR
KM22	FAN UNIT 2 CONTACTOR
KM23	FAN UNIT 3 CONTACTOR
KM3	COMPRESSOR 3 CONTACTOR
KM4	COMPRESSOR 4 CONTACTOR
KM40	EVAPORATOR HEATER CONTACTOR
QM13	PUMP 1 MOTOR OVERLOAD CUT-OUT
QM14	PUMP 2 MOTOR OVERLOAD CUT-OUT
QS1	MAIN POWER DISCONNECT SWITCH
TC1	CONTROL CIRCUITS TRANSFORMER

5. START-UP

5.1 PRELIMINARY CHECKS

- Check that the electrical connections have been made correctly, and that all terminals are well tightened.

- Check that the voltage on the RST terminals is 400 V ± 5% (or the unit's rated value, in the event of units supplied to run on non-standard power supplies). If the mains voltage is subject to frequent fluctuations, consult our Engineering Department to discuss the necessary protection systems.

- Check that the display shows the gas pressure in the refrigerant circuit (4-compressor models only).

- Inspect the unit for refrigerant leaks using a leak detector if necessary.

- Check that the crankcase heaters are correctly supplied with power.

Significant leakage of R407C refrigerant in the gaseous state will alter the percentages of the remaining mixture with consequent fall-off of performance.

The heaters must be connected at least 12 hours before starting the unit; the heaters are automatically connected when the main disconnect switch is set to the ON position.

- Verify that heaters are working correctly: after the warm up period the crankcase must be warm to the touch and must have at least a temperature 10 - 15 °C higher than ambient temperature.

- Check that all hydraulic connections are correctly installed and all indications on unit labels are observed.

- Check that the hydraulic system has been vent to eliminate any air remaining; charge it gradually and open the vent devices on the upper part, provided at the care of the installer together with an expansion tank of a proper size.

Warning: before starting up the unit check that all the closing panels are in position and secured with the relative screws.

6 UNIT WITH mCHILLER MICROPROCESSOR (models from 3.2 to 13.2)

6.1 INTRODUCTION

"µchiller" is an electronic microprocessor system designed to control all the unit's functions.
The terminal is equipped with five LEDs indicating the operating status of the machine (summer/winter), the compressor status (On/Off) and indication of the compressors/pump hour counter after the first 100 hours of operation. An internal beeper (which can be inhibited by means of a microswitch or a parameter) sounds to warn of machine operating anomalies.

6.1.1 Display

The display comprises three digits with automatic display of the decimal point. During normal operation the display shows the value of the evaporator inlet water temperature.
"µchiller" can be connected to a computer, by means of an optional electronic board, making available remote supervision and telediagnostic services for complete management, supervision and diagnostics of the systems from a remote location.

Figure 13

6.1.2 Machine status information

Machine status information is shown by five LEDs on the remote control display (figure 14).

Figure 14

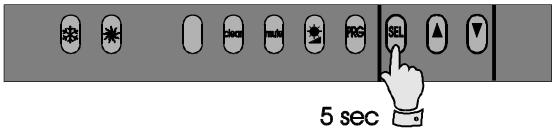
6.1.3 Keypad

The keypad allows machine operating parameters to be programmed. The wall-mounted version features an extended number of keys to facilitate use. The function of each key is illustrated on the following pages.

Figure 15

6.1.4 Control and display screens

Method of accessing the set-point and main machine control parameters.



Parameter scroll keys

Figure 16

Pressing the keys marked with an up or down arrow allows you to scroll through the parameters. The SEL key is pressed again to display the value of the selected parameter, with the facility to edit the value if required using the Up or Down keys. The PRG key is pressed to store changed values and to stop the procedure, while pressing the SEL key returns you to the parameter selection menu. If no keys are pressed, in an interval of 10 seconds, during parameter editing the display starts flashing. If no keys have been pressed within 60 seconds, after activating the programming procedure, the controller will return to the temperature display without saving any changes that have been made. This procedure is useful if it proves unnecessary to alter any parameters.

6.1.5 Muting the BUZZER

Press the MUTE key to silence the buzzer if it is currently sounding.

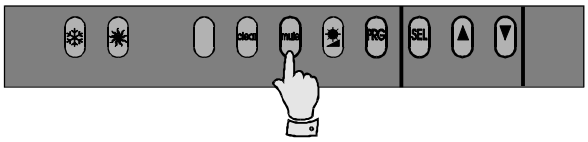


Figure 17

6.1.6 ALARMS reset

Pressing the Up or Down keys for more than 5 seconds cancels any alarms currently in the memory (manual reset), clear the associated message from the display and deactivate the alarm relay. In wall mounted models this function is obtained by pressing the CLEAR key for 5 seconds.

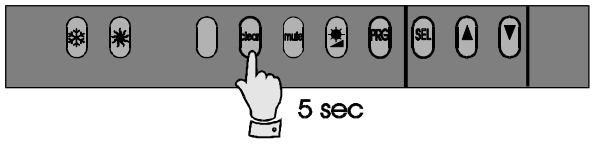


Figure 18

6.1.7 Activation/deactivation of COOLING operation (summer mode)

Pressing the key for more than 5 seconds activates or deactivates the summer operating mode (refer also to parameter P6). It is not possible to switch directly from Winter mode to Summer mode without first deactivating Winter mode. If the machine was previously running in Winter mode pressing this key will have no effect.

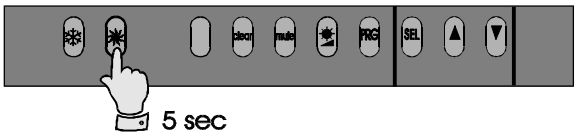


Figure 19

6.1.8 Activation/deactivation of HEATING mode (winter mode)

Pressing the key for more than 5 seconds activates or deactivates the winter operating mode. It is not possible to switch directly from Summer mode to Winter mode. If the machine was previously running in Summer mode pressing this key will have no effect - Summer mode must be deactivated before the change can be made.

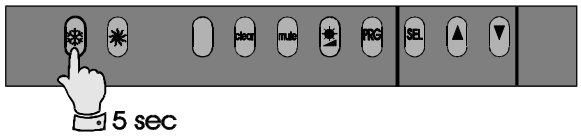
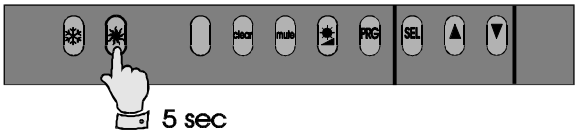


Figure 20

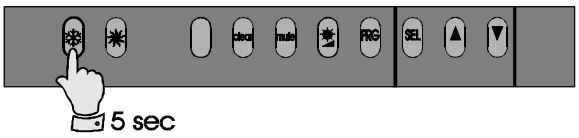
6.1.9 Switching off the machine (stand by)

To switch off the machine deactivate both Summer and Winter modes.



Switch off the unit when working in cooling mode (Summer).

Figure 21



Switch off the unit when working in heating mode (Winter).

Figure 22

6.1.10 Inlet water temperature control:

To edit the operating values (within the operating limits) hold down the SEL button for 5 seconds. When it flashes use the Up or Down arrow keys to enter the required inlet water temperature on the display. Confirm the value you have just entered by pressing the SEL button again (figure 23).

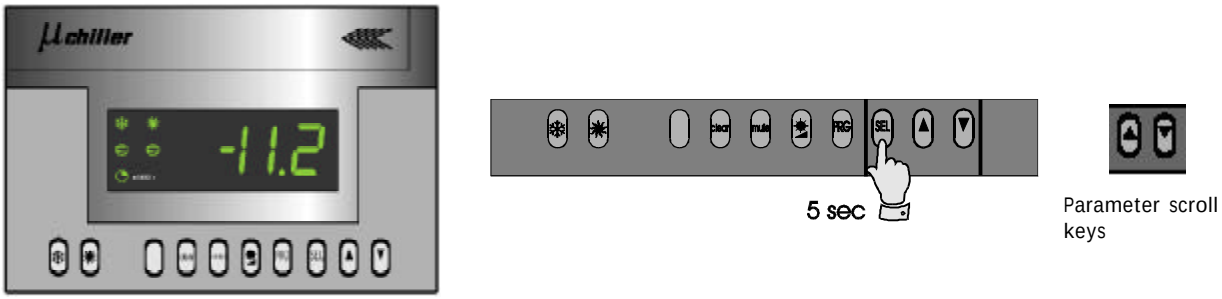


Figure 23

6.1.11 Defrosting (heat pump mode only)

During winter heat pump mode operation the finned coil of the air cooled condenser functions as an evaporator, cooling and dehumidifying ambient air.
During heat pump operation, the evaporation pressure is monitored to prevent it from falling below a preset value. The evaporation control is active only during heating mode operation.
Depending on the ambient air temperature and humidity conditions, condensate or frost will tend to form, consequently obstructing the free passage of air and causing thermal insulation. The frost that builds up on the coil obstructs the passage of air and reduces the available heat exchange surface area (and thus the thermal efficiency) and can damage the heat exchanger.
Defrosting is the procedure that eliminates the ice that has formed on the evaporator coil during heat pump mode operation of an air/water unit.
Defrosting is performed simultaneously for the entire unit.
All heat pump versions are equipped with a control that activates an automatic coil defrost cycle when necessary. After starting however, the first defrost cycle will be started after a preset minimum operating time to allow the formation of sufficient thermal inertia to allow the cycle to be completed successfully.
Defrost cycle activation is based on the detection of a low suction pressure value due to insufficient heat exchange between the evaporator and the air due to the formation of a layer of ice, which exerts a thermal insulation effect. For a defrost cycle to be able to start a suction pressure of at least one of the currently operating compressors must remain below the pressure set for the defrost cycle trip signal for a preset time interval.
Before starting to defrost the coils, all the compressors are started, after which the unit reverses its operation from heat pump to chiller mode.
When the cycle is reversed the fans stop and the compressors force hot gas into the coil.
A pressure switch on the high pressure circuit maintains the discharge gas pressure below the defrost end value. To maintain the pressure lower than the defrost end pressure the pressure switch activates the fans.
To reduce the air flow and obtain more efficient heating of the outer part of the coil, the pressure switch signal causes the fans to rotate in reverse.
When the defrost end temperature is reached, as measured by a thermostat with a probe located in the lower part of the coil, the pressure switch allows the discharge pressure to reach the defrost end pressure.
When the defrost end pressure has been reached, the controller reverses the unit from chiller mode to heat pump mode, thereby terminating the defrost procedure.
Even though in certain conditions the surface temperature of the coil and the condensation pressure fail to reach the defrost values within the preset time limit, the defrost cycle is forcibly terminated as though the defrost end signal were present. The controller restarts the fans, and when the pressure lowers again to the preset value, it reverses the unit's operating mode again.
If the defrost cycle is forcibly interrupted, with the timeout signal, a message is displayed on the controller, although no controller functions are activated.
The defrost timeout alarm is automatically cleared from the active alarms menus when a defrost cycle terminates

normally because the defrost end pressure has been reached. In any event, the alarms historical file will contain a record of all defrost cycles that were terminated forcibly due to a timeout intervention.
Consecutive defrost cycles must be at least 30 minutes apart. If the forced defrost signal persists, inform the Service organisation.

If the unit fails to start: do not change internal electrical connections on penalty of immediate invalidation of the warranty.

Warning: The operating mode changeover should only be seasonal. Frequent changeover from summer to winter operating mode and vice-versa could cause damage to the compressors.

During idle periods do not disconnect the unit from the power supply (the compressor crankcase heaters must remain switched on). Disconnect the unit from the power supply only in the event of prolonged disuse (e.g. seasonal shutdowns). For temporary shutdown of the unit refer to the guide lines given in the specific headings of this manual.

Electronic components of the microprocessor may be damaged at temperatures below - 20 °C.

6.2 STARTING THE UNIT

The ZETA 2002 unit is equipped, as standard, with direct keypad control.
Optionally the unit can be equipped to operate via a remote permissive (e.g. a clock, etc.). The remote interlock must be connected across terminals 1-2. Enabling the unit to start or stop is only possible via the keypad.

6.2.1 COOLING:

- Press the button as shown in figure 24.

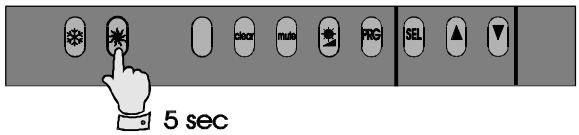


Figure 24

6.2.2 HEATING (operation in heat pump mode):

- Press the button as shown in figure 25.

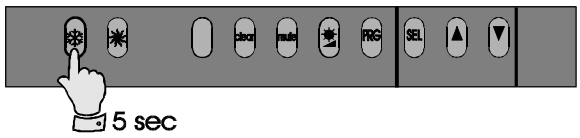
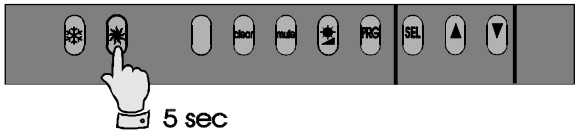


Figure 25

6.3 STOPPING THE UNIT

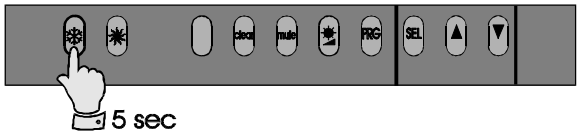
6.3.1 Temporary stop

The unit is stopped by pressing the cooling key or, in the case of a heat pump unit operating in winter mode, by pressing the heating key.



Shutdown of unit operating in summer cooling mode

Figure 26



Shutdown of unit operating in winter heating mode

Figure 27

Warning: do not use the machine main power switch to stop the unit. The crankcase heaters will be disconnected, resulting in serious risk to the compressors when the unit is started again.

6.3.2 Seasonal stop:
- Disconnect the power supply
- Drain the system circuit (unless it contains a water/glycol solution)
- When the unit is to be restarted repeat the initial start-up procedure

Warning: do not use the machine main power switch to stop the unit: this switch must be used to disconnect the electrical supply when no current is flowing on the circuit, i.e. only when the unit is in OFF status. Note also that if power is disconnected from the unit the crankcase heaters will be switched off with the resulting risk of compressor damage at the time of restarting.

6.4 EMERGENCY STOP

Emergency stops are obtained by turning the red colour main disconnect switch on the electrical panel to position 0.

7. TROUBLESHOOTING

The following pages contain a list of the most common causes that can result in the shutdown or anomalous operation of the chiller. Faults are arranged in accordance with easily identifiable symptoms.

In relation to possible corrective action pay maximum attention to the operations you intend to perform as overconfidence coupled with insufficient attention due to lack of expertise can lead to serious accidents. We therefore recommend that Blue Box or other skilled HVAC engineers are contacted to identify and correct the problem.

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
A) No compressor running. Fans stopped (display off)	Ä	Ä	No mains power	Check presence of mains power
	Ä	Ä	Main power switch Off (position "O")	Turn mains power selector to position "I"
	Ä	Ä	No power to control circuits	Check condition of fuses FU50, FU51, FU52. Check operation of the transformer
	Ä	Ä	Incorrect phase sequence (relay KA5 with only green LED illuminated)	Invert two of the phase wires of the power feed line; when the unit is powered up again both the green LED and the yellow LED should light
	Ä	Ä	Relay KA5 with green and yellow LEDs off	Check fuses FU56; If fuses are OK replace phase sequence relay
B) No compressor running. Fans stopped (display on no alarm messages)	Ä	Ä	Unit in stand-by mode	Start unit (see relative section of the manual)
	Ä	Ä	No consent from service thermostat	System at set-point temperature, no heating/cooling demand; check settings and operation.
	Ä	Ä	No external consent	Check operation of circulating pumps, flow switches, bleed air from the system; check that contacts 1 and 2 are closed, check other external consents.
	Ä	Ä	Compressor motor burnt out or compressor seized	Replace compressor
	Ä	Ä	Anti-recycle timer running	Wait for 5 minutes until the timer generates a consent

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
C) No compressor running. Fans stopped (display On with alarm "FL")	Ä	Ä	No water flow at evaporator	Check hydraulic system
	Ä	Ä	Faulty flow switch	Check contact of flow switch and replace if necessary
D) No compressor running. Fans stopped (display On with alarm “F1” or “F2”)	Ä	Ä	Fan thermal protection intervention	Check insulation between windings and between windings and earth; replace fan if necessary.
E) No compressor running. Fans stopped (display On with alarm "A1")	Ä	Ä	No consent of defrost thermostat due to insufficient water flow rate	Check hydraulic circuit and wait until the water temperature exceeds the value necessary for the unit to restart
	Ä	Ä	No consent of defrost thermostat due to insufficient glycol concentration	The programmed set-point is too low for the percentage of glycol in the circuit. Increase the glycol percentage and reduce the defrost set-point.
F) No compressor running. Fans stopped (display On with alarm "E1")	Ä	Ä	Connections to evaporator inlet temperature sensor interrupted	Restore correct connection of temperature sensor
	Ä	Ä	Evaporator inlet temperature sensor faulty	Replace temperature sensor

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
G) No compressor running. Fans running (display On with alarm "E3" or "E5")	Ä	Ä	Resistance RK3 or RK4 faulty or disconnected	Check resistance and replace if necessary
	Ä	Ä	Connections to pressure sensor interrupted (HP version only or if condensation pressure control with fan speed regulator is fitted)	Restore correct connections to pressure sensor ("E3" refers to compressor 1, "E5" refers to compressor 2)
	Ä	Ä	Faulty pressure sensor (only on HP version or if condensation pressure control with fan speed regulator is fitted)	Replace pressure sensor ("E3" refers to compressor 1, "E5" refers to compressor 2)
H) Unit runs with insufficient capacity (Display On without alarms)	Ä	Ä	Insufficient refrigerant charge	Check refrigerant circuits with leak detector, repair leak and recharge circuit
	Ä	Ä	Presence of moisture in refrigerant circuit	Replace refrigerant filter and, if necessary, dehydrate and recharge circuit
	Ä	Ä	One compressor fails to start, power circuit open and compressor contactor energised	Find and eliminate the cause of the protection intervention; change the fuses. If the fuses blow immediately, replace the compressor.
	Ä	Ä	A compressor fails to start, fuses are OK and compressor contactor is de-energised	Check voltage across compressor contactor coil and continuity of coil; if necessary, replace coil
		Ä	4-way reversing valve seized or coil faulty	Check power supply and coils of valves and replace valves if necessary

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
l) Compressor 1 and/or 2 not working (display On with alarm "H1" and/or "H2")	Ä	Ä	Circuit overcharged	Check refrigerant charge and remove if necessary;
	Ä	Ä	High pressure switch faulty	Check and replace if necessary
	Ä		Coil filters clogged; air flow too low	Clean filters with compressed air
	Ä	Ä	Presence of incondensable gas in the refrigerant circuit	Empty circuit, apply vacuum, and recharge
	Ä		Fans faulty	Check and replace fans
		Ä	Faulty circulating pump	Check and replace
		Ä	Defrost-end pressure switch not working	Check and replace
	Ä		Fan motor electrical connections incorrect	Check that connections are as indicated on electrical drawing
	Ä		Fan contactors not energised	Check voltage across coil of contactor KM21 and electrical continuity of coil circuit

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
L) Compressor 1 and/or 2 not working (display On with alarm “L1” and/or “L2”)	Ä	Ä	Refrigerant circuit completely empty	Check refrigerant circuit with leak detector after pressurising to approximately 4 bar. Repair leak, apply vacuum, charge circuit.
	Ä	Ä	Low pressure switch faulty	Check and replace if necessary
		Ä	Coil filter clogged; air flow too low	Clean filter with compressed air
	Ä	Ä	Refrigerant filter clogged	Check and replace if necessary
		Ä	Fans faulty	Check and replace if necessary
	Ä		Faulty water circulating pump	Check and replace if necessary
		Ä	Defrost pressure switch has incorrect setting	Check and correct setting
	Ä	Ä	Liquid refrigerant valve not completely open (if present)	Check and open fully
	Ä	Ä	Thermostatic expansion valve not operating correctly	Check, clean, or replace if necessary
		Ä	Fan motor electrical connections incorrect	Check that connections are as indicated on electrical schematic
		Ä	Fan contactors not energised	Check voltage across coil of contactor KM21 and electrical continuity of coil circuit

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
M) Compressor 1 and/or 2 not working (display On with alarm "C1" and/or "C2")	Ä	Ä	Insufficient refrigerant charge	Find leak with leak detector, repair, and recharge circuit
		Ä	4-way valve locked	Replace valve
	Ä	Ä	Lack of oil	Check quantity of oil in circuit and replenish as necessary. Check that the circuit has all the necessary measures to ensure oil return to the compressor
N) Ice on liquid refrigerant pipe	Ä	Ä	Liquid refrigerant filter clogged	Replace filter
	Ä	Ä	Valve on liquid refrigerant line (if present) not completely open	Open valve fully
O) Compressor 1 and/or 2 running. Ice on coil (display On with warning message "r1")		Ä	Insufficient refrigerant charge	Find leak with leak detector, repair, and recharge circuit
P) Compressors run constantly	Ä	Ä	Operating thermostat incorrectly set or faulty	Check setting; replace thermostat if necessary
	Ä	Ä	Lack of refrigerant gas charge	Check and recharge if necessary
	Ä	Ä	Excess thermal load	Reduce thermal load

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
Q) Anomalous noise from system	Ä	Ä	Compressor noisy	Contact service organisation for check and replacement if necessary
	Ä	Ä	Thermostatic valve noisy	Contact service organisation for check and replenish refrigerant charge
	Ä	Ä	Vibrating pipes	Contact service organisation to secure piping
	Ä	Ä	Casing panels vibrate	Check that panels are properly fastened; contact service organisation if necessary
	Ä	Ä	Worn fan bearings	Check; replace fan if necessary

If the display presents alarms other than those described previously, contact the Service organisation.

8 UNIT WITH pCO² MICROPROCESSOR (models from 14.4 to 26.4)

8.1 INTRODUCTION

The pCO² electronic microprocessor controller with the DBBB0*P20Z program is designed to manage chiller and heat pump units, with control of 4 compressors.
The program configuration manages the total control of the air-cooled unit with plate exchangers including compressor start/stop times, safety devices and other auxiliary functions such as condensation control in cooling mode, free-cooling, heat recovery and other functions described later in this manual.
The necessary hardware is optimised to obtain the maximum advantage from the available inputs and outputs; the connection between various circuit boards and the user interface terminal is achieved via the pLANE using the dedicated RS485 serial connector for network connections.
Each unit can also be connected to remote supervision and/or telediagnostics systems by means of an RS485 serial line.

Detailed information on the operation of the above systems is provided in the specific controller manual supplied with the unit.

8.1.1 Display

The back-lit LCD display comprises 4 lines and 20 columns.

Figure 28

8.1.2 Keypad

In addition to the LCD display, the user interface is equipped with the following function keys:

"Menu" key: press this key from any menu to return to the opening menu.

Maintenance key: press this key to access the maintenance menus.

Print key: this key is currently not used.

"I/O" key: pressing this key opens the menus containing the status of the digital inputs and outputs together with the values read on the analogue inputs and the value of the analogue outputs

"Clock" key: press this key to open the clock menus.

"Set" key: this key opens the menus in which the various operating set-points can be edited.

"Prog" key: this key opens the service menus.

"? info" key: pressing this key opens a menu in which the address of the component connected to the terminal can be changed.

"Summer" key (blue) and "winter" key (red): in the case of chiller + heat-pump units, press these keys to select the required operating mode.

"ON/OFF" key: press this key to switch from Stand- by to ON or vice versa.

"Alarm" key: this key serves to mute the alarm buzzer, display any active alarms, and reset them in certain cases.

Arrow key: the arrow keys allow you to navigate through the menus; when an editable field is selected, the arrow keys serve to change the current value.

"Enter" key: pressing this key allows you to access fields containing editable parameters and also to confirm any changes you make to such parameters.

Electronic components could be damaged by air temperature below -20 °C.

8.2 OPERATING DESCRIPTION

8.2.1 Introduction

The microprocessor control regulates the water temperature of the evaporator maintaining it at the set-point value acting on the compressors management.
As well as the compressors the controller manages the operation of other components of the chiller such as the pumps (ST version) and fans, with relative operating times and alarms, and "ancillary" functions such as condensation control, etc., as described below.

Almost all the parameters referred to below (set-points, differentials, calibration, delays...) can be programmed by means of the various menus. Refer to the specific manual for the pCO² controller.

8.2.2 Unit in stand-by mode

The unit is in stand-by mode when it is correctly supplied with power but not actually enabled to operate.
In this condition the display shows the values of the various machine parameters, but the operation of the compressor is not inhibited.
Power-on is obtained by pressing the "ON-OFF" button of the microprocessor control or via an external interlock.

8.2.3 Enabling the unit

Start-up of the unit from stand-by mode can be achieved after closing the external enabling contact, by pressing the "ON/OFF" button, or by means of a signal on the serial line.
Activation of the controller outputs that manage the various sections of the chiller is executed in strict compliance with the operating times. If the "ON" button is pressed before the external interlocks are closed, the display indicates which of the external interlocks is not yet enabled.
Operation of the pump has priority to the compressors, which can start only after the evaporator and condenser pumps are running.

8.2.4 Pump management (ST units only)

If system pump control is included switching on the unit will automatically enable the pump.
If there are two pumps (run and stand-by) they will be activated alternately when the programmed operating time limit for each pump has elapsed.
When the pumps are switched over both pumps will run in tandem, for a few seconds, to ensure a constant flow of water in the system circuit.
When the unit is switched from active status to stand-by, if performed by opening an external permissive, the currently active pump of the ST unit will be stopped with a delay interval, after the disconnection of the last compressor in operation, making it possible to exploit the thermal inertia of the system.

8.2.5 Compressor start-up

The controller allows the compressors to be started if the flow switch input is closed within the compressor start-up delay time interval. If the flow switch input opens, after the compressor has started, the trip is retarded if it occurs within the time programmed for the compressor stop.
If the unit trips due to the opening of the flow switch input, the relative alarm is displayed.
Starting and stopping of the compressors and capacity step control is managed by the controller in accordance with the building cooling demands.

8.2.6 Chiller mode operation

In chiller operation, the controller lowers the water temperature value, maintaining it as close as possible to the programmed set-point.

In the standard version, in which the control acts on the evaporator entering water, the management of compressor operation and capacity steps is linked to the difference between the entering water temperature and the programmed set-point.

8.2.7 Heat pump mode operation

In heat pump operation, the controller increases the water temperature value, maintaining it as close as possible to the programmed set-point.
Management of compressor operation is performed in the same way as already illustrated for chiller mode operation.

8.2.8 **Evaporator low temperature chilled water protection**

If the evaporator leaving water temperature is lower than the limit value programmed in the low temperature chilled water protection set-point, the controller will stop all the compressors and activate the low temperature water alarm.
This alarm must be reset manually and the compressor restarted only when the evaporator leaving water temperature is equal to or higher than the alarm trip value, increased by the low temperature water differential.
The low temperature water alarm can only appear when the unit is switched on (in stand-by conditions the freeze alarm is not operational).

8.2.9 Evaporator anti-freeze protection electric heater (optional)

In conditions that lead to tripping the freeze alarm, the controller energises the heater.
The heater remains powered for the entire time that the conditions for the freeze alarm continue.
Unlike the low water temperature alarm, which is enabled only when the unit is powered on, the anti-freeze heater can be energised when the machine is on stand-by.

8.2.10 Compressor operation

When the unit is running correctly and no general alarms are present, the microprocessor controller starts the compressors in accordance with the water temperature reading.
Compressor starts are staggered in accordance with preset delay intervals, thus avoiding excess input current surges.
Before starting a compressor, the microprocessor checks the value of the delivery pressure by means of the relevant transducer, the status of the high pressure switch and the compressor motor windings temperature by checking the thermal protection.

When the compressor has been started, tripping of any of the safety devices will cause the compressor to stop immediately and an alarm will be displayed.
While the compressor is running, discharge pressure and suction pressure are monitored constantly by means of the relevant sensors.

On unit start-up the first compressor is started with a delay, set on the microprocessor controller, after the start of the hydraulic system circulating pump.
Once started, each compressor must run for a minimum operating period, unless a critical alarm should trip in the meantime.
The critical alarms which can stop the compressor during the minimum operating time are the high pressure alarm and the compressor thermal cut-out alarm. Once stopped each compressor can be restarted only after a minimum idle time or after a minimum time interval between two consecutive starts has elapsed.
The consecutive starting of two compressors or the consecutive starting of one compressor, is executed with minimum delay intervals equal to the capacity step activation time.
Stopping compressors is also performed with a minimum programmed delay interval.

8.2.11 Compressor management

Start-up of the compressors is automatic when the reference water temperature changes with respect to the programmed set-point.
Normally the reference water temperature is the value detected at the inlet to the chiller unit.
Balancing of duty hours over all the compressors in the unit is performed by selecting the rotation of starts.
With the rotation function of starts active, the first compressor to start is the first one that previously stopped. The first compressor to start will be the one with the least operating hours.

8.2.12 High and low pressure alarms

Discharge pressure (high pressure) and suction pressure (low pressure) are managed by the microprocessor controller through the relevant sensors.
When a compressor is running, the controller checks that:
- Discharge pressure is always lower than the safety value set for cooling or heating mode operation. If the values are exceeded, the controller immediately stops the compressor and displays a high pressure alarm. The high pressure alarm can be reset manually on the controller only when the pressure detected by the discharge pressure sensor is lower than the value that caused the alarm to trip, less the differential value.
- The suction pressure is always higher than the safety value set for operation in cooling or heating mode. If the value read by the suction pressure sensor is lower than the limits set for the relative operating conditions, the controller will stop the compressor and generate a low pressure alarm. The low pressure alarm is not instantaneous, but operates after a preset delay interval, both in the starting phase and during the normal running of the machine. The low pressure alarm can be reset automatically or manually, depending on the relative parameter setting. In all cases the low pressure alarm can only be reset when the pressure detected by the suction sensor is higher than the value that caused the alarm to trip, plus the differential value. It is possible to program the number of permissible consecutive compressor starts before the unit shuts down in safety status.

8.2.13 Low ambient temperature kit (option - condensing control with fan speed regulator)

As the ambient air temperature decreases the necessary condensing pressure for correct operation of the chiller cycle is maintained, within the machine operating range, by adjusting the cooling air flow through the condenser.
Condensing pressure control is only active when the machine is operating in chiller mode.
When the unit is operating in heat pump mode this function is inhibited and the fans are forced to their maximum speed.
The controller checks the condensing pressure and adjusts fan speed on the basis of the circuit with the highest pressure reading. The speed regulator adjusts fan speed with a phase control system that minimises problems related to electromagnetic compatibility.
Speed control is available over a 40-100% range. At the time of start-up the fans always run at 40% nominal speed.

8.2.14 Changeover from chiller to heat pump and vice versa

The changeover from chiller to heat pump and back can be performed at any time, either by means of an external signal on a digital input, from the keypad, or via the serial line. The operating mode changeover must be only seasonal and only with the unit off.
After a mode changeover, the controller re-starts the unit in the new mode with a factory set minimum delay time.
The unit operates with temperature control on the inlet to which has been inactive for the longest time. the unit (or return from the system).

8.2.15 Defrosting (heat pump units only)

During winter heat pump mode operation the finned coil of the air cooled condenser functions as an evaporator, cooling and dehumidifying ambient air.
During heat pump operation, the evaporation pressure is monitored to prevent it from falling below a preset value. The evaporation control is active only during heating mode operation.
Depending on the ambient air temperature and humidity conditions, condensate or frost will tend to form, consequently obstructing the free passage of air and causing thermal insulation. The frost that builds up on the coil obstructs the passage of air and reduces the available heat exchange surface area (and thus the thermal efficiency) and can damage the heat exchanger.
Defrosting is the procedure that eliminates the ice that has formed on the evaporator coil during heat pump mode operation of an air/water unit.
Defrosting is performed simultaneously for the entire unit.
All heat pump versions are equipped with a control that activates an automatic coil defrost cycle when necessary. After starting however, the first defrost cycle will be started after a preset minimum operating time to allow the formation of sufficient thermal inertia to allow the cycle to be completed successfully.
Defrost cycle activation is based on the detection of a low suction pressure value due to insufficient heat exchange between the evaporator and the air due to the formation of a layer of ice, which exerts a thermal insulation effect. For a defrost cycle to be able to start a suction pressure of at least one of the currently operating compressors must remain below the pressure set for the defrost cycle trip signal for a preset time interval.

Before starting to defrost the coils, all the compressors are started, after which the unit reverses its operation from heat pump to chiller mode.
When the cycle is reversed the fans stop and the compressors force hot gas into the coil.
A pressure switch on the high pressure circuit maintains the discharge gas pressure below the defrost end value.
To maintain the pressure lower than the defrost end pressure the pressure switch activates the fans.
To reduce the air flow and obtain more efficient heating of the outer part of the coil, the pressure switch signal causes the fans to rotate in reverse.
When the defrost end temperature is reached, as measured by a thermostat with a probe located in the lower part of the coil, the pressure switch allows the discharge pressure to reach the defrost end pressure.
When the defrost end pressure has been reached, the controller reverses the unit from chiller mode to heat pump mode, thereby terminating the defrost procedure.
Even though in certain conditions the surface temperature of the coil and the condensation pressure fail to reach the defrost values within the preset time limit, the defrost cycle is forcibly terminated as though the defrost end signal were present. The controller restarts the fans, and when the pressure lowers again to the preset value, it reverses the unit's operating mode again.
If the defrost cycle is forcibly interrupted, with the timeout signal, a message is displayed on the controller, although no controller functions are activated.
The defrost timeout alarm is automatically cleared from the active alarms menus when a defrost cycle terminates normally because the defrost end pressure has been reached. In any event, the alarms historical file will contain a record of all defrost cycles that were terminated forcibly due to a timeout intervention.
Consecutive defrost cycles must be at least 30 minutes apart. If the forced defrost signal persists, inform the Service organisation.

8.2.16 Total heat recovery (option)

Heat recovery is the function where all the energy that would normally be rejected to the air cooled condenser is recovered at a refrigerant to water condenser installed in series with the air-cooled condenser.
The heat recovery process is managed by the microprocessor controller.
During energy recovery the fans are stopped and the condensing coil is by-passed via solenoid valves connected downstream of the thermostat valve. The machine is equipped with a liquid receiver.
Heat recovery can only occur when the water temperature at the recovery exchanger inlet is lower than the recovery set-point. Heat recovery is terminated when the temperature increases by the recovery differential value.
It is mandatory to use a condensing pressure control valve (one for each hydraulic circuit) or three-way valve, fitted by the installer, to avoid condensation values that are incompatible with operation of the machine.

8.2.17 Dual set-point (option)

Operation with a dual set-point is possible only in chiller mode.
With double thermostatic valves and solenoid valves that are automatically switched according to the required expansion temperature. Two set-point values can be programmed on the microprocessor controller via the keypad or a digital input. Switching of the thermostatic valves is always automatic, in accordance with the water temperature.
The valves are sized on the basis of the temperature values specified at the time of the order. The machine operating limits shown in the catalogue are not affected. If the hydraulic circuit contains glycol in sufficient quantities to eliminate the risk of freezing, the lower limit is extended to a minimum of -5 °C leaving water temperature.

8.2.18 Operation leaving water temperature control (option)

With leaving chilled water temperature control the reference sensor must be installed on the evaporator outlet or, if there is more than one evaporator, on the common outlet pipeline downstream from the relative manifold.
The unit's capacity steps are activated / deactivated with delay intervals in relation to a dead zone. When the leaving water temperature is higher than the programmed set-point compressors start is enabled.

8.3 STARTING THE UNIT

For the start-up procedure refer also to the microprocessor controller manual.

- Close the external enabling contacts
- Press the "ON" button on the microprocessor controller
- If all the controls are enabled the display will show the message "UNIT ON"

After having performed the above procedures the unit will start automatically after a delay of approximately 5 minutes, assuming that the enabling signals of the microprocessor, the flow switches, and the water pumps continue to be present.

If the unit fails to start: do not change internal electrical connections on penalty of immediate invalidation of the warranty.

Important: on heat pump versions the operating cycle must be reversed at the start and end of the season. Frequent switching from summer to winter mode, and vice versa, should be avoided at all costs because it can lead to malfunctions and subsequent breakdown of the compressors.

During idle periods do not disconnect the unit from the power supply (the compressor crankcase heaters must remain switched on in these intervals). Disconnect the unit from the power supply only in the event of prolonged disuse (e.g. seasonal shutdowns). For temporary shutdown of the unit refer to the guide lines given in paragraph 8.4.

8.4 STOPPING THE UNIT

8.4.1 Temporary stop:

- To stop the unit press the "OFF" button on the front panel.

Figure 29

8.4.2 Seasonal stop:

- Disconnect the power supply
- Drain the system circuit (unless it contains a water/glycol solution)
- When the unit is to be restarted repeat the initial start-up procedure

Warning: do not use the machine main power switch to stop the unit: this switch must be used to disconnect the electrical supply when no current is flowing on the circuit, i.e. only when the unit is in OFF status. Note also that if power is disconnected from the unit, the crankcase heaters will be switched off with the resulting risk of compressor damage at the time of restarting.

8.5 EMERGENCY STOP

Emergency stops are obtained by turning the red colour main disconnect switch on the electrical panel to position 0.

9. TROUBLESHOOTING

The following pages contain a list of the most common causes that can result in the shutdown or anomalous operation of the chiller. Faults are arranged in accordance with easily identifiable symptoms.

In relation to possible corrective action, adopt the maximum attention in the operations you intend to perform as overconfidence coupled with insufficient attention due to lack of expertise can lead to serious accidents. We therefore recommend that Blue Box or other skilled HVAC engineers are contacted to identify and correct the problem.

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
A) No compressor running. Fans stopped (display Off)	Ä	Ä	No mains power	Check presence of mains power
	Ä	Ä	Main power switch Off (position "O")	Turn main power selector to position "I"
	Ä	Ä	No power to control circuits	Check fuses FU50, FU51, FU52. Check operation of transformer
	Ä	Ä	Incorrect phase sequence (relay KA5 with only green LED lit)	Invert two of the phase wires of the power supply line; when the unit is powered up again both the green and yellow LEDs should light
	Ä	Ä	Relay KA5 with green and yellow LEDs off	Check fuses FU56; If fuses are OK replace phase sequence relay
B) No compressor running. Display On: ”OFF from external consent”	Ä	Ä	No external consent	Check presence of external consent; if not present, bridge terminals 1 and 2
C) No compressor running. Display On: ”OFF from supervision system”	Ä	Ä	No consent from supervision system	Activate operation from supervision system
D) No compressor running. Display On: ”OFF”	Ä	Ä	No consent from “on/off” key of user interface	Press “on/off” key

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
E) No compressor running. Display On: unit ON with alarm "High Pressure Compressor 1, 2, 3, 4"	Ä Ä	Ä	220V fuses burnt-out (FU51) Fans contactor not energised	Change fuses. If fuses burn-out again, contact assistance Check voltage across the contactor coil and coil continuity
	Ä		Fan fuses burnt-out (FU21)	Check cause of burn-out and change fuses.
	Ä		Fan motor faulty	Check and replace if necessary
F) No compressor running. Display On: unit ON with alarm "Fans protection"	Ä	Ä	Fan thermal protection intervention	Check insulation between windings and from windings to ground
	Ä	Ä	Fan motor faulty	Check and replace if necessary
	Ä	Ä	Faulty fan alarm relay	Check and replace relay
G) No compressor running. Display On: unit ON with alarm "Thermal protections Compressor 1, 2, 3, 4"	Ä	Ä	Drop in power feeding voltage	Check voltage stability and fit appropriate protection if necessary
	Ä	Ä	Setting of thermal protections	Contact assistance
	Ä	Ä	Circuits partially discharged	Call service to replenish charge

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
H) No compressor running. Display On: unit ON with alarm "Low Pressure compressor 1, 2, 3, 4"	Ä		Insufficient percentage of glycol in hydraulic circuit	Restore correct glycol percentage
	Ä	Ä	Both circuits have insufficient refrigerant charge	Find possible leaks in circuit, repair, and recharge
		Ä	Fans contactor not energised	Check voltage across the contactor coil and coil continuity
		Ä	Fan motor faulty	Check and replace if necessary
	Ä		Insufficient water flow to evaporator	Check hydraulic circuit
		Ä	Incorrect setting of defrost set-point	Check and correct setting if necessary
I) No compressor running. Display On: unit ON with alarm "Exceeded Threshold Low Temperature of leaving User Water"	Ä		Insufficient water flow to evaporator	Increase water flow to evaporator and check temperature rise
	Ä	Ä	Faulty controller	Contact service organisation
	Ä		Defrost sensor short circuit	Contact service organisation
J) No compressor running. Display On: unit ON with alarm "Exceeded Threshold Low Temperature User Water Reference"		Ä	Excessive thermal load	Reduce thermal load

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
K) No compressor running. Display On: unit ON with alarm "Exceeded Threshold High Temperature of entering User Water	Ä		Excessive thermal load	Wait until entering water temperature is below the alarm set point. Start hydraulic circuit of evaporator and unit. If not sufficient contact assistance.
	Ä		Refrigerant circuits partially discharged	Call assistance
L) No compressor running. Display On: unit ON with alarm "No power to Control circuits"	Ä	Ä	Power supply voltage not stable	Check power supply voltage; if not correct contact the electricity company
	Ä	Ä	Fuses FU51 burnt-out	Check cause of fuse burn-out and replace fuses.
M) No compressor running. Display On: unit OFF with alarm "Flow Switch Alarm"	Ä	Ä	No water flow to evaporator	Check hydraulic circuit
	Ä	Ä	Flow switch faulty	Check flow switch contact and replace if necessary
N) No compressor running. Display On: unit OFF with alarm "Incorrect Phase Sequence" and phase sequence relay with green LED On and orange LED Off	Ä	Ä	Incorrect phase sequence	Invert two of the phase wires of the power supply line
O) No compressor running. Display On: unit OFF with alarm "Incorrect Phase Sequence" and phase sequence relay with green and orange LEDs On	Ä	Ä	Faulty relay	Check to ensure that relay closes contact

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
P) No compressor running. Display On: unit OFF with alarm "Incorrect Phase Sequence" and phase sequence relay with green and orange LEDs Off	Ä	Ä	Fuses FU56 burnt-out	Check fuse FU56 and replace if necessary
	Ä	Ä	One of the three phases is not present	Check connection of each phase
Q) No compressor running. Display On: unit ON without alarm	Ä	Ä	No consent from digital input to compressors	Check consent to compressors and close relative contacts
	Ä	Ä	Unit at temperature	Normal operation
	Ä	Ä	Compressor fuses burnt-out	Check continuity of fuses; if burnt-out call service
	Ä	Ä	Controller faulty	Call service
R) One or more compressors switched off. Display On with alarm "High Pressure Compressor"	Ä	Ä	Excess refrigerant charge	Check refrigerant charge and call service organisation
	Ä	Ä	Refrigerant circuit contains non-condensable gas	Empty circuit, apply vacuum, and recharge
	Ä	Ä	High pressure switch incorrectly set or faulty	Check pressure switch setting
	Ä		Condenser coil or coil filters (if present) clogged	Clean coil and filters (if present) with compressed air

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
S) One or more compressors switched off. Display On with alarm "Low Pressure Compressors"	Ä	Ä	Insufficient refrigerant charge due to leak in circuit	Call service organisation
	Ä	Ä	Thermostatic valve faulty	Call service organisation
	Ä	Ä	Solenoid valve of liquid refrigerant line faulty (if present)	Call service organisation
	Ä		Dehydrating filter clogged	Call service organisation
		Ä	Evaporator coil or coil filters (if present) clogged	Clean coil and filters (if present) with compressed air
T) One or more compressors switched off. Display On with alarm "Compressor Thermal Protections"	Ä	Ä	Problems at the compressor	Call service organisation
U) One or more compressors Off. Display On without alarms	Ä	Ä	Unit capacity step active	Normal operation
	Ä	Ä	Fuses burnt-out	Call service organisation
	Ä	Ä	Faulty controller	Call service organisation
	Ä	Ä	No external consent to compressor	Check compressor external consent
V) All compressors running. Display On with alarm "Compressor Maintenance"	Ä	Ä	Compressors specified by alarm require maintenance	Call service for scheduled maintenance

SYMPTOM	OPERATION		PROBABLE CAUSE	POSSIBLE CORRECTIVE ACTION
	COOLING	HEATING		
W) All compressors running. Display On with alarm “Unit Maintenance”	Ä	Ä	Unit maintenance required	Call service for scheduled maintenance
X) All compressors running without stopping. Display On without alarm	Ä	Ä	Excessive thermal load	Call service organisation
	Ä	Ä	Refrigerant circuits partially discharged	Call service organisation
	Ä		Liquid refrigerant filter clogged	Clean or replace
	Ä	Ä	Controller not working	Call service organisation
		Ä	4-way reversing valve not energised	Check power supply and solenoid valve coils and replace if necessary
Y) Anomalous noise from system	Ä	Ä	Compressor noisy	Contact service organisation for check and replacement if necessary
	Ä	Ä	Thermostatic valve noisy	Contact service to check and add refrigerant
	Ä	Ä	Vibrating pipes	Contact service organisation to secure pipes
	Ä	Ä	Casing panels vibrate	Check that panels are properly fastened; contact service organisation if necessary
	Ä	Ä	Worn fan bearings	Check; replace fan if necessary

If the display presents alarms other than those described above, contact the service organisation.

10 CHECKS DURING OPERATION

10.1 INTRODUCTION

- Check that the water temperature at the evaporator inlet is close to the set-point value of the service thermostat.

- For units equipped with pump units, if the pump runs noisily, close the relative delivery cock until the pump starts running smoothly again. This situation can occur when system pressure drops deviate significantly from the pump available pressure.

10.1.1 Checking the refrigerant charge

- After a few hours of unit operation check that the sight glass moisture indicator has a green coloured core. if the core is yellow, moisture is present in the circuit. In such a situation the circuit must be dehydrated by a qualified technician.

- Check the sight glass for air bubbles. A constant passage of bubbles through the sight glass could indicate that the refrigerant must be replenished. Occasional bubbles are considered normal.

- Check that refrigerant liquid superheating is between 5 and 7 °C; to do this:

  1) measure the temperature using a contact thermometer placed on the compressor suction pipeline;
  2) read the temperature, equivalent to the pressure read on the pressure gauge connected to the compressor suction side (saturation temperature corresponding to suction pressure); for units charged with R407C refrigerant, refer to the D.P. (Dew Point) pressure gauge scale.

  The difference between the temperatures measured in this manner is equivalent to the superheating value.

- Check that refrigerant subcooling is between 5 and 7 °C; to do this:

  1) measure the temperature using a contact thermometer placed on the compressor discharge pipeline;
  2) read the temperature, equivalent to the pressure read on the pressure gauge connected to the liquid connection at the condenser outlet (saturation temperature corresponding to condenser delivery pressure); for units charged with R407C refrigerant, refer to the B.P. (Bubble Point) pressure gauge scale.

  The difference between the temperature values measured in this manner is equivalent to the subcooling value.

11. CALIBRATION OF CONTROL EQUIPMENT

11.1 INTRODUCTION

All the control equipment is factory calibrated before the machine is shipped. Control equipment and safety devices should nonetheless be checked after a reasonable period of operation. Calibration values are given in Tables 3 and 4.

All service operations on the control equipment must be carried out by QUALIFIED PERSONNEL ONLY; incorrect calibration values can cause serious damage to the unit and personal injury.

TABLE 3 - CALIBRATION OF CONTROL EQUIPMENT

CAPACITY STEPS		2		4	
CONTROL ELEMENT		SET POINT	DIFFERENTIAL	SET POINT	DIFFERENTIAL
Service calibration (summer)	°C	10	2	9	3
Service calibration (winter)	°C	42	2	43	3

TABLE 4 - CALIBRATION OF SAFETY DEVICES

CONTROL ELEMENT		ACTIVATION SET-POINT	DIFFERENTIAL	RESET
No-frost setting	°C	3	6	manual
Maximum pressure switch setting	bar	27	7	manual
Minimum pressure switch setting	bar	2.5 / 0.7 *	1	manual (from controller)
Evaporator heater setting	°C	3	6	automatic
Defrost start setting	bar	2	--	automatic
Defrost end setting	bar	18	--	automatic
Defrost end thermostat setting	°C	5	--	automatic
Defrost pressure switch setting	bar	16	2	automatic

* Chiller / heat pump

12. MAINTENANCE AND PERIODIC CHECKS

12. 1 WARNINGS

All operations described in this chapter MUST BE PERFORMED EXCLUSIVELY BY QUALIFIED PERSONNEL.

Make sure that the unit has been disconnected from the power supply before carrying out any work or accessing internal parts.

The compressor head and discharge pipeline can reach high temperatures. Always exert caution when working in the vicinity of the compressor.

Adopt the maximum caution when working in the vicinity of the finned coils because of the sharp edges of the aluminium fins.

After performing maintenance work always refit the outer panels and secure them with the screws.

12.2 INTRODUCTION

Carry out the following periodic checks to ensure the unit is operating correctly:

CHECK	PERIOD
Check that safety and control devices work correctly as previously described	monthly
Check that all the terminals within the electric panel and compressor are tight The sliding terminals of the contactors should be periodically cleaned: if any damage is found, replace the contactors	monthly
Check the sight glass to verify the refrigerant charge.	monthly
Check that there is no oil leakage from the compressor	monthly
Check that there is no water leakage in the hydraulic system	monthly
If the unit is to be stopped for a long period the hydraulic circuit, including all pipes and heat exchangers, should be drained. This is compulsory if the ambient temperature is expected to fall below the freezing point of the liquid employed.	seasonal operation
Check process water levels	monthly
Check that the flow switch is operating correctly.	monthly
Check that the crankcase heater is operating correctly and there is a power supply.	monthly
Clean metallic filters on water piping	monthly
Clean the finned coil or the filter coils, if present, by means of compressed air, which should be directed in the opposite direction to the normal direction of air flow. If the coil is completely clogged clean with a jet of water.	monthly
Execute a defrost test (heat pump units only)	monthly
Check the condition, anchorage, and balancing of fans	every 4 months
Check the colour of the sight glass core (green = no moisture, yellow = moisture present): if it is yellow change the refrigerant filter	every 4 months
Check that the noise level has not increased.	every 4 months

12.3 REPAIRING THE REFRIGERANT CIRCUIT

If repairs have been made to the refrigerant circuit, perform the following steps:

- leak test;
- vacuum and dehydration of refrigerant circuit;
- refrigerant charge.

If the circuit is to be emptied, use the appropriate equipment to collect the refrigerant.

12.3.1 Leak test

Charge the refrigerant circuit to a pressure of 15 bar with dry nitrogen gas by means of a cylinder fitted with a pressure reducer. Check the circuit for leaks with a leak detector. The formation of bubbles or foam indicates the presence of leaks.
If leaks are found during the test, empty the refrigerant circuit and then repair the point of leakage by welding with appropriate alloys.

Do not use oxygen instead of nitrogen: explosion hazard.

12.3.2 High vacuum and dehydration of the refrigerant circuit

To generate a high vacuum in the refrigerant circuit use a high vacuum pump able to reach 0.1 mbar of absolute pressure with a flow rate of 10 m3/h. With this type of pump, a single vacuum cycle is normally sufficient to reach an absolute pressure of 0.1 mbar.
If this type of pump is not available, or in the event that the circuit has been left open for a long period of time, you are strongly advised to use the triple evacuation method. This procedure is also prescribed in the event of moisture in the refrigerant circuit.

Connect the vacuum pump to the charge connector.
Proceed as follows:

- Evacuate the circuit to a pressure of at least 35 mbar absolute. Charge the circuit with nitrogen to a relative pressure of approx. 1 bar.

- Repeat the operation described above.

- Repeat the operation described above for the third time in order to reach the highest degree of vacuum possible.

This procedure should guarantee the elimination of up to 99% of contaminants.

12.3.3 Refrigerant charge

- Connect the refrigerant gas cylinder to the male 1/4 SAE charge connector on the liquid line and allow a small amount of gas to escape in order to purge the connection hose of air.

- The circuit must be charged exclusively with liquid; therefore, if the cylinder is not equipped with a dip pipe it must be turned upside-down.

Units operating with R407C must be charged exclusively with liquid refrigerant by way of the charge connection on the liquid line.

A unit that was originally factory charged with R22 cannot be charged with R407C (and vice versa) without major modifications. Consult Bluebox if necessary.

12.4 ENVIRONMENTAL CONSIDERATIONS

Laws governing the use of substances detrimental to the ozone layer prohibit the dispersal of refrigerant gases in the environment, obliging users to recover refrigerants at the end of their useful life and consign them to the dealer or to specific collection centres.
Refrigerants R22 and R407C are mentioned among substances subject to special monitoring regimes established by law, and as such they are subject to the prescriptions indicated above.

Use special care during maintenance work in order to limit the risk of refrigerant leakage as far as possible.

13. DECOMMISSIONING THE UNIT

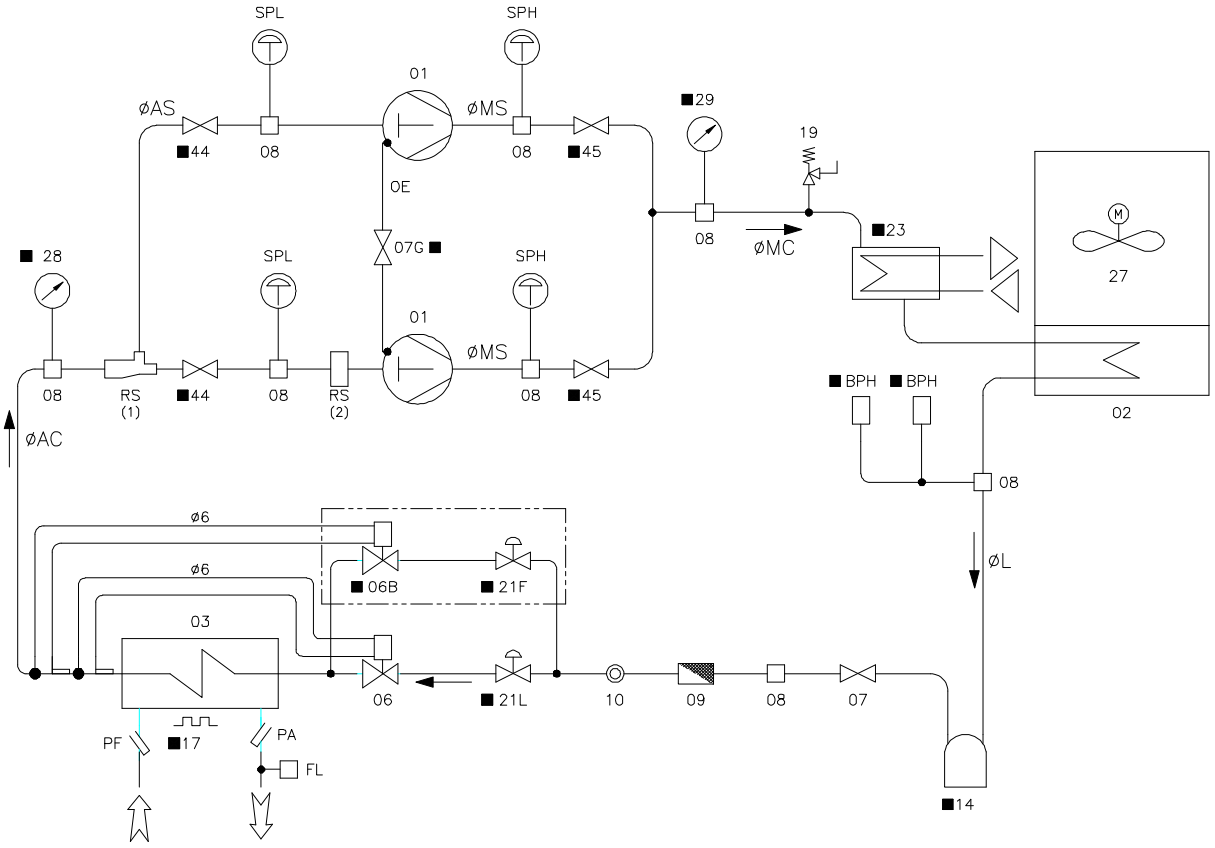
When the unit has reached the end of its useful life and must therefore be removed and replaced, adhere to the following rules:

- the refrigerant must be recovered by a qualified technician and sent to an authorised collection centre;
- also the compressor lubrication oil must be recovered and sent to a collection centre;
- the structure and components, if unusable, must be stripped down and separated according to the material type; this is particularly important for copper and aluminium, which are fairly abundant on the machine.

This procedure is designed to assist the work of collection, disposal, and recovery specialists and to reduce the associated environmental impact.

REFRIGERANT CIRCUIT

ZETA 2002 - MODELS 3.2 - 13.2



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE	CONDENSER
03	EVAPORATORE	EVAPORATOR
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
06B	VALVOLA TERMOSTATICA BASSA TEMP	LOW TEMP THERMOSTATIC VALVE
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL' OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA'	MOISTURE INDICATOR SIGHT GLASS
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21F	VALVOLA SOLENOIDE ABILIT. TERMOST. BASSA TEMP.	LOW TEMP. THERMOST. VALVE ENABLE SOLENOIDN VAL.
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BPH	TRASDUTTORE DI ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER
FL	FLUSSOSTATO	FLOW SWITCH
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RS	RESTRICTOR	RESTRICTOR
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH
SPL	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE SWITCH

■ OPTIONALE-OPTIONAL

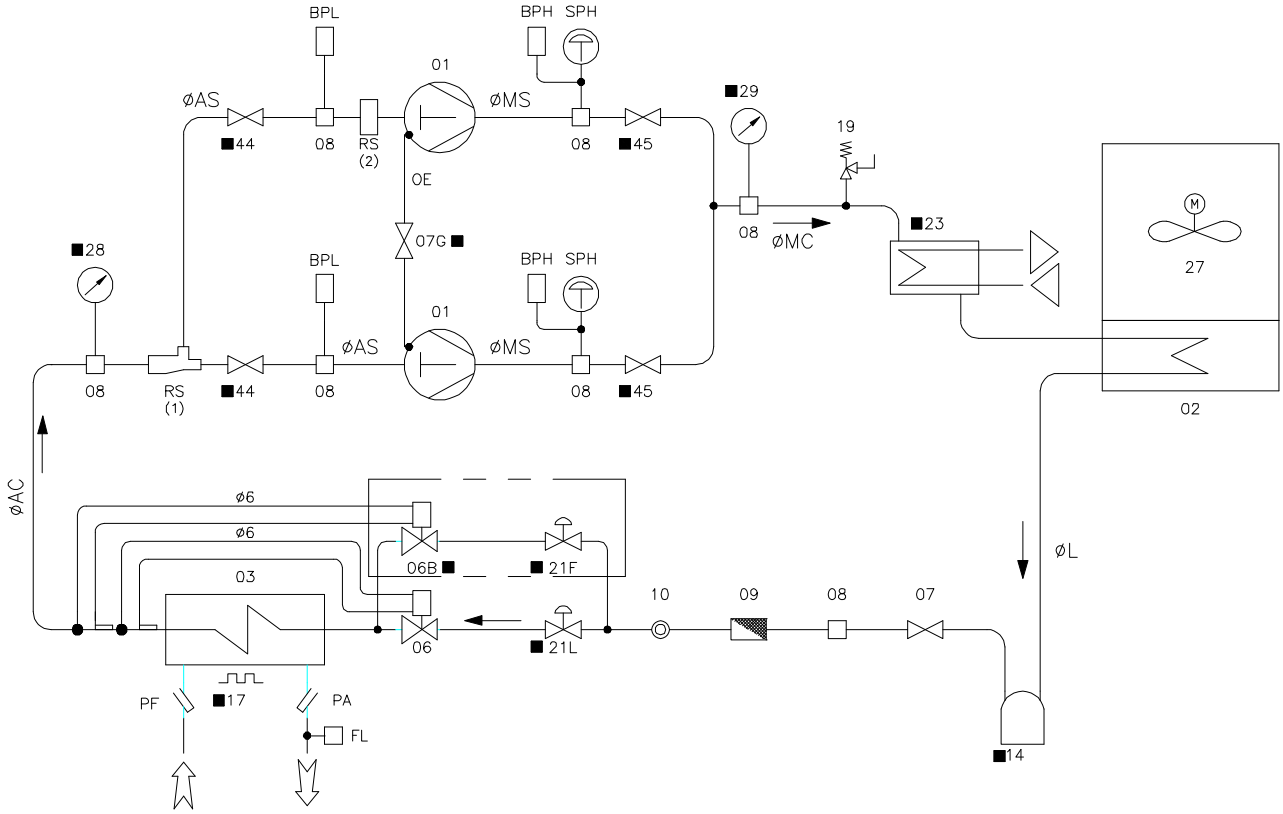
(1) SOLO SU MOD. 3.2-9.2
ONLY FOR MOD. 3.2-9.2

(2) SOLO SU MOD. 12.2 SU COMPR. SZ 240
ONLY FOR MOD. 12.2 IN COMPR. SZ 240

	AC	AS	MC	MS	L
3.2	35	28	22	18	16
4.2	35	35	22	22	18
5.2	42	28	22	18	18
6.2	42	35-28	28	22-18	22
7.2	42	35	28	22	22
8.2	42	35	28	22	22
9.2	54	42	35	28	28
10.2	54	42	35	28	28
12.2	54	42	35	28	28
13.2	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002 - MODELS 14.4 - 26.4



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE	CONDENSER
03	EVAPORATORE	EVAPORATOR
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
06B	VALVOLA TERMOSTATICA BASSA TEMP	LOW TEMP THERMOSTATIC VALVE
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL'OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA'	MOISTURE INDICATOR SIGHT GLASS
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21F	VALVOLA SOLENOIDE ABILIT. TERMOST. BASSA TEMP.	LOW TEMP. THERMOST. VALVE ENABLE SOLENOIDN VAL.
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BPH	TRASDUTTORE DI ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER
BPL	TRASDUTTORE DI BASSA PRESSIONE	LOW PRESSURE TRANSDUCER
FL	FLUSSOSTATO	FLOW SWITCH
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RS	RESTRICTOR	RESTRICTOR
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH

■ OPZIONALE–OPTIONAL

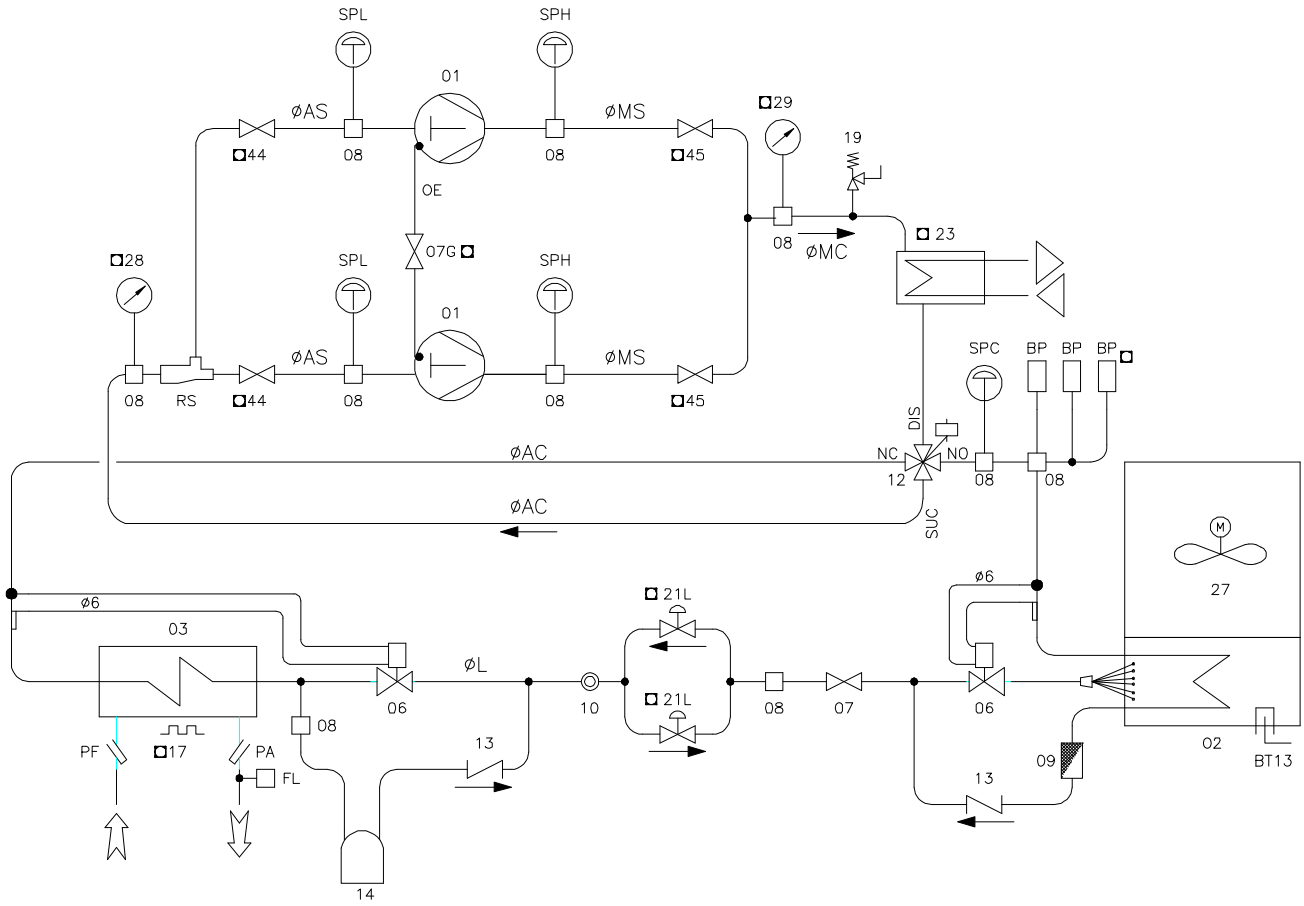
(1) SOLO MODELLI 14.4–18.4
ONLY MOD. 14.4–18.4

(2) SOLO MODELLI 24.4 SU COMPR.SZ 240
ONLY MOD. 24.4 IN COMPR. SZ 240

	AC	AS	MC	MS	L
14.4	42	35	28	22	22
16.4	42	35	28	22	22
18.4	54	42	35	28	28
20.4	54	42	35	28	28
24.4	54	42	35	28	28
26.4	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002/HP - MODELS 3.2 - 8.2



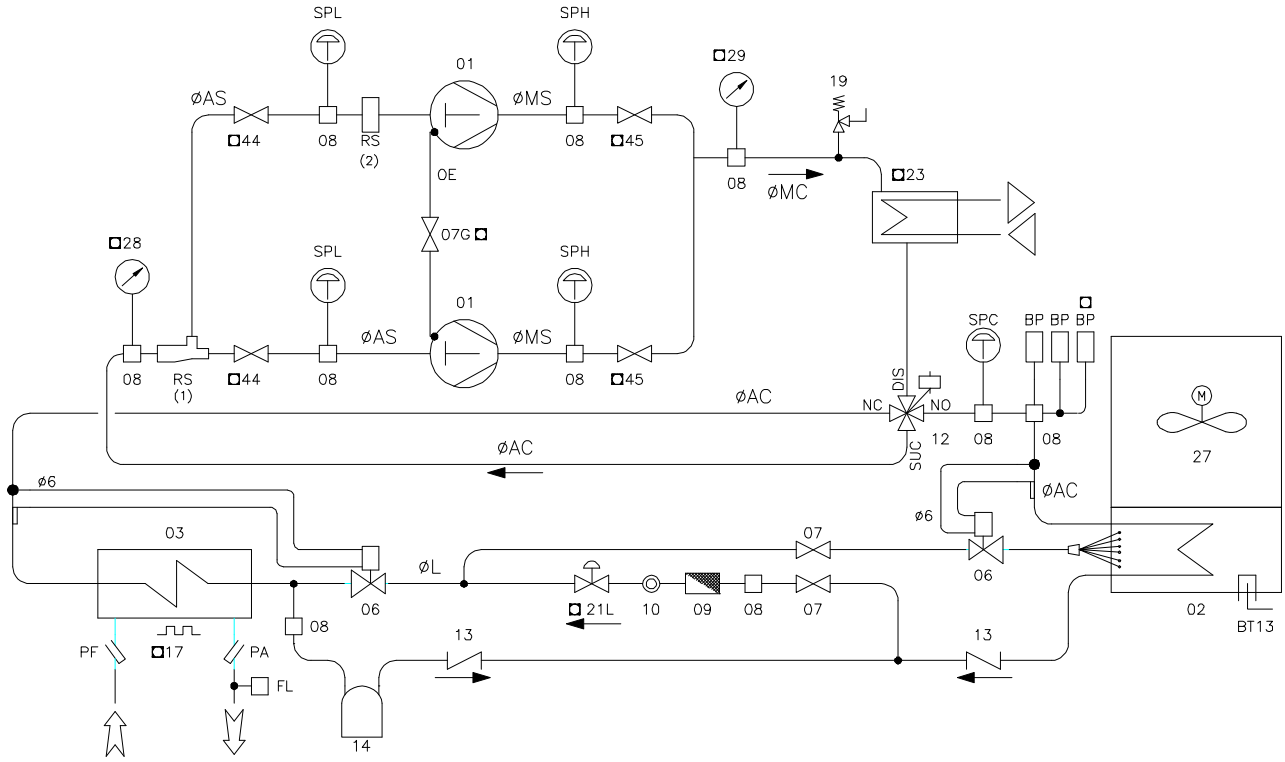
	DECSRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE (EVAP. IN FUNZIONAMENTO INVERNALE)	CONDENSER (EVAP. IN WINTER OPERATION)
03	EVAPORATORE (CONDENS. IN FUNZ. INVERN.)	EVAPORATOR (CONDENSER IN WINTER OPERATION)
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL' OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA '	MOISTURE INDICATOR SIGHT GLASS
12	VALVOLA A INVERSIONE DI CICLO	REVERSE CYCLE VALVE
13	VALVOLA DI RITEGNO LINEA DEL LIQUIDO	LIQUID LINE CHECK VALVE
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BP	TRASDUTTORE DI PRESSIONE	PRESSURE TRANSDUCER
BT13	SONDA TERMOSTATO BATTERIA	BATTERY THERMOSTAT PROBE
FL	FLUSSOSTATO	FLOW SWITCH
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RS	RESTRICTOR	RESTRICTOR
SPC	PRESSOSTATO ALTA SBRINAMENTO AUTOMATICO	DEFROST HIGH PRESSURE SWITCH
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH
SPL	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE SWITCH

□ OPTIONALE-OPTIONAL

	AC	AS	MC	MS	L
3.2	35	28	22	18	16
4.2	35	35	22	22	18
5.2	35	28	22	18	18
6.2	42	35-28	28	22-18	22
7.2	42	35	28	22	22
8.2	42	35	28	22	22

REFRIGERANT CIRCUIT

ZETA 2002/HP - MODELS 9.2 - 13.2



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE (EVAP. IN FUNZIONAMENTO INVERNALE)	CONDENSER (EVAP. IN WINTER OPERATION)
03	EVAPORATORE (CONDENS. IN FUNZ. INVERN.)	EVAPORATOR (CONDENSER IN WINTER OPERATION)
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL' OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA '	MOISTURE INDICATOR SIGHT GLASS
12	VALVOLA A INVERSIONE DI CICLO	REVERSE CYCLE VALVE
13	VALVOLA DI RITEGNO LINEA DEL LIQUIDO	LIQUID LINE CHECK VALVE
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BP	TRASDUTTORE DI PRESSIONE	PRESSURE TRANSDUCER
BT13	SONDA TERMOSTATO BATTERIA	BATTERY THERMOSTAT PROBE
FL	FLUSSOSTATO	FLOW SWITCH
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RS	RESTRICTOR	RESTRICTOR
SPC	PRESSOSTATO ALTA SBRINAMENTO AUTOMATICO	DEFROST HIGH PRESSURE SWITCH
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH
SPL	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE SWITCH

□ OPZIONALE–OPTIONAL

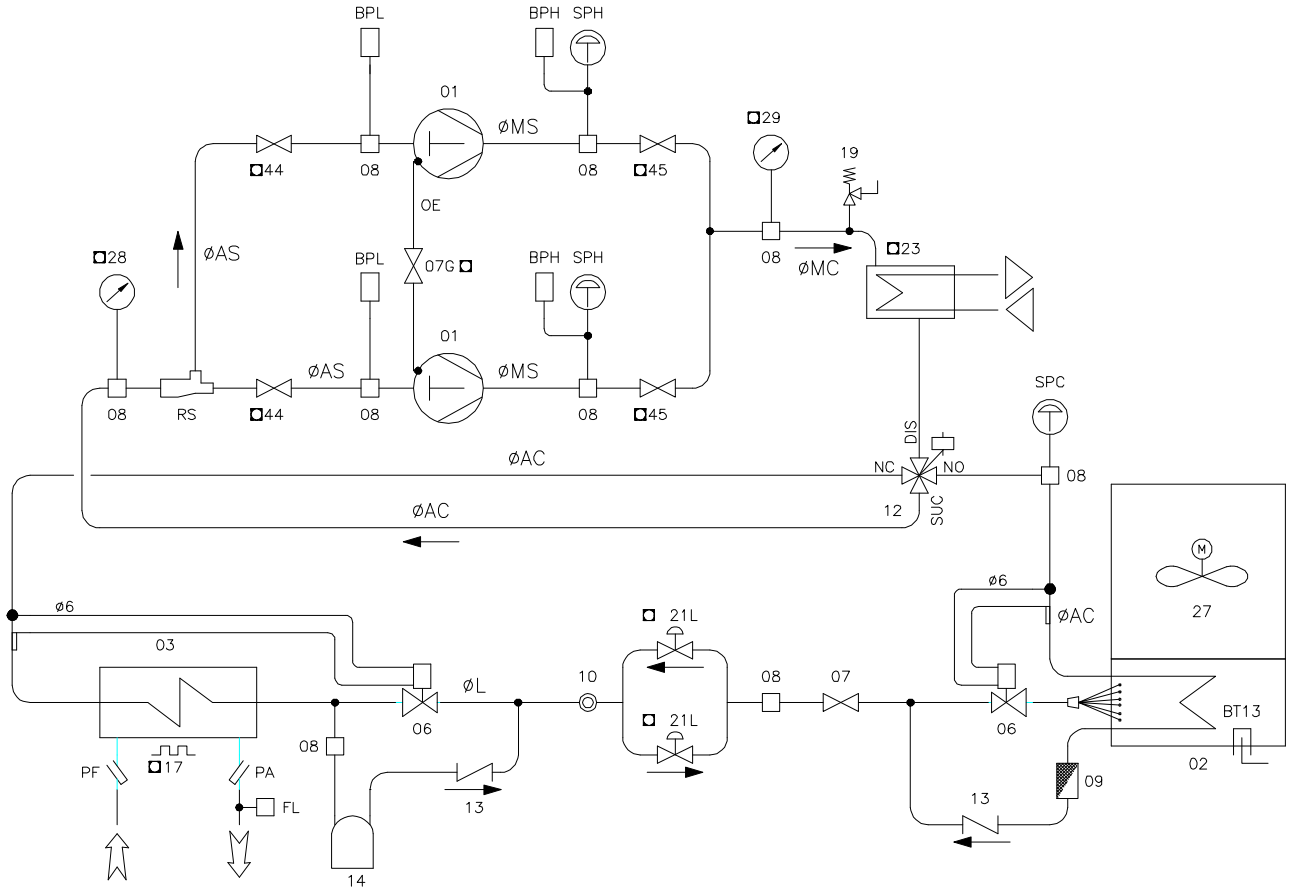
(1) SOLO MOD. 9.2
ONLY MOD. 9.2

(2) SOLO SU MOD. 12.2 SU COMPR. SZ 240
ONLY FOR MOD.12.2 IN COMPR. SZ 240

	AC	AS	MC	MS	L
9.2	54	42	35	28	28
10.2	54	42	35	28	28
12.2	54	42	35	28	28
13.2	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002/HP - MODELS 14.4 - 16.4



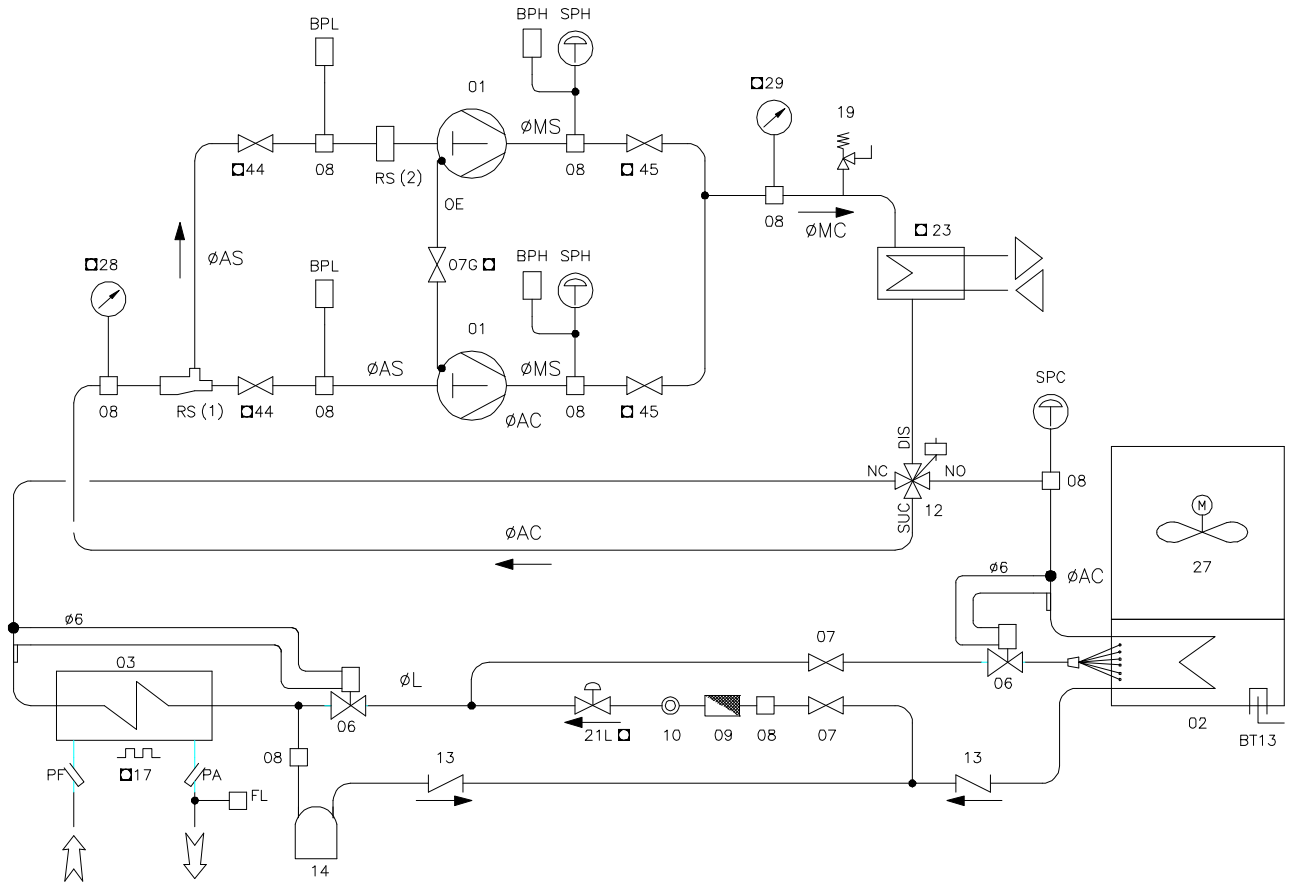
	DESCRIZIONE	DESCRIPTIOM
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE (EVAP. IN FUNZIONAMENTO INVERNALE)	CONDENSER (EVAP. IN WINTER OPERATION)
03	EVAPORATORE (CONDENS. IN FUNZ. INVERN.)	EVAPORATOR (CONDENSER IN WINTER OPERATION)
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL' OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA '	MOISTURE INDICATOR SIGHT GLASS
12	VALVOLA A INVERSIONE DI CICLO	REVERSE CYCLE VALVE
13	VALVOLA DI RITEGNO LINEA DEL LIQUIDO	LIQUID LINE CHECK VALVE
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BPH	TRASDUTTORE DI ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER
BPL	TRASDUTTORE DI BASSA PRESSIONE	LOW PRESSURE TRANSDUCER
BT13	SONDA TERMOSTATO BATTERIA	BATTERY THERMOSTAT PROBE
FL	FLUSSOSTATO	FLOW SWITCH
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RS	RESTRICTOR	RESTRICTOR
SPC	PRESSOSTATO ALTA SBRINAMENTO AUTOMATICO	DEFROST HIGH PRESSURE SWITCH
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH

□ OPZIONALE–OPTIONAL

	AC	AS	MC	MS	L
14.4	42	35	28	22	22
16.4	42	35	28	22	22

REFRIGERANT CIRCUIT

ZETA 2002/HP - MODELS 18.4 - 26.4



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE (EVAP. IN FUNZIONAMENTO INVERNALE)	CONDENSER (EVAP. IN WINTER OPERATION)
03	EVAPORATORE (CONDENS. IN FUNZ. INVERN.)	EVAPORATOR (CONDENSER IN WINTER OPERATION)
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL' OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA '	MOISTURE INDICATOR SIGHT GLASS
12	VALVOLA A INVERSIONE DI CICLO	REVERSE CYCLE VALVE
13	VALVOLA DI RITEGNO LINEA DEL LIQUIDO	LIQUID LINE CHECK VALVE
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETROBASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BPH	TRASDUTTORE DI ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER
BPL	TRASDUTTORE DI BASSA PRESSIONE	LOW PRESSURE TRANSDUCER
BT13	SONDA TERMOSTATO BATTERIA	BATTERY THERMOSTAT PROBE
FL	FLUSSOSTATO	FLOW SWITCH
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RS	RESTRICTOR	RESTRICTOR
SPC	PRESSOSTATO ALTA SBRINAMENTO AUTOMATICO	DEFROST HIGH PRESSURE SWITCH
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH

□ OPZIONALE–OPTIONAL

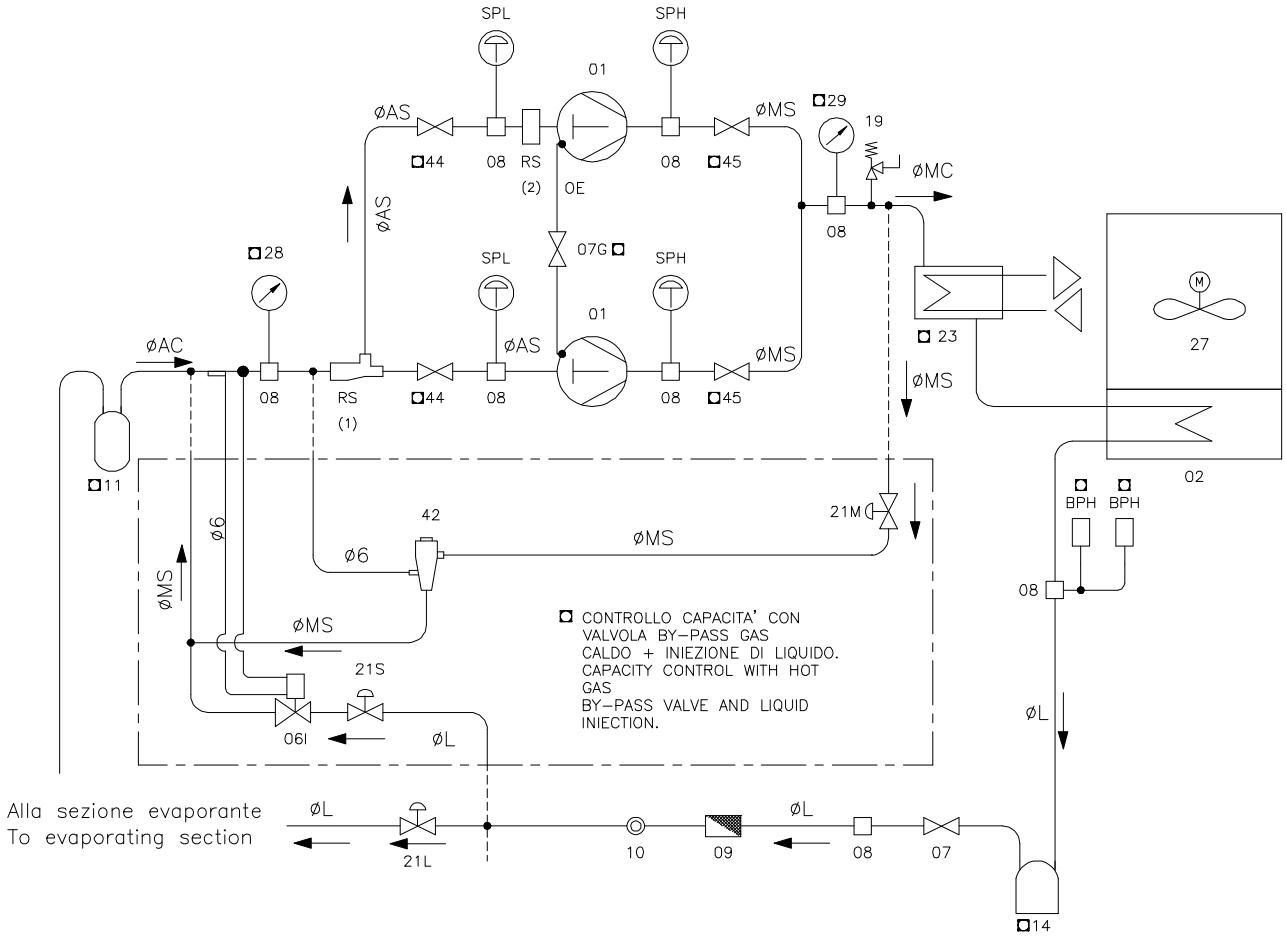
(1) SOLO SU MOD. 18.4
ONLY FOR MOD. 18.4

(2) SOLO SU MOD. 24.4 SU COMP. SZ240
ONLY FOR MOD. 24.4 IN COMP. SZ240

	AC	AS	MC	MS	L
18.4	54	42	35	28	28
20.4	54	42	35	28	28
24.4	54	42	35	28	28
26.4	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002/LE - MODELS 3.2 - 13.2



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE	CONDENSER
06I	VALVOLA TERMOST. INIEZ. LIQUIDO	THERMOST. VALVE FOR LIQUID INJECT.
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL'OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA'	MOISTURE INDICATOR SIGHT GLASS
11	SEPARATORE DI ASPIRAZIONE	SUCTION LINE ACCUMULATOR
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
21M	VALVOLA SOLENOIDE CONTROLLO EVAP.	EVAP. CONTROL SOLENOID VALVE
21S	VALVOLA SOLENOIDE INIEZ. DEL LIQ. COMPRESS.	COMPRESS. LQUID INJECTION SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
42	VALVOLA CONTROLLO EVAPORAZIONE	EVAPORATING CONTROL VALVE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BPH	TRASDUTTORE DI ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
RS	RESTRICTOR	RESTRICTOR
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH
SPL	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE SWITCH

□ OPZIONALE-OPTIONAL

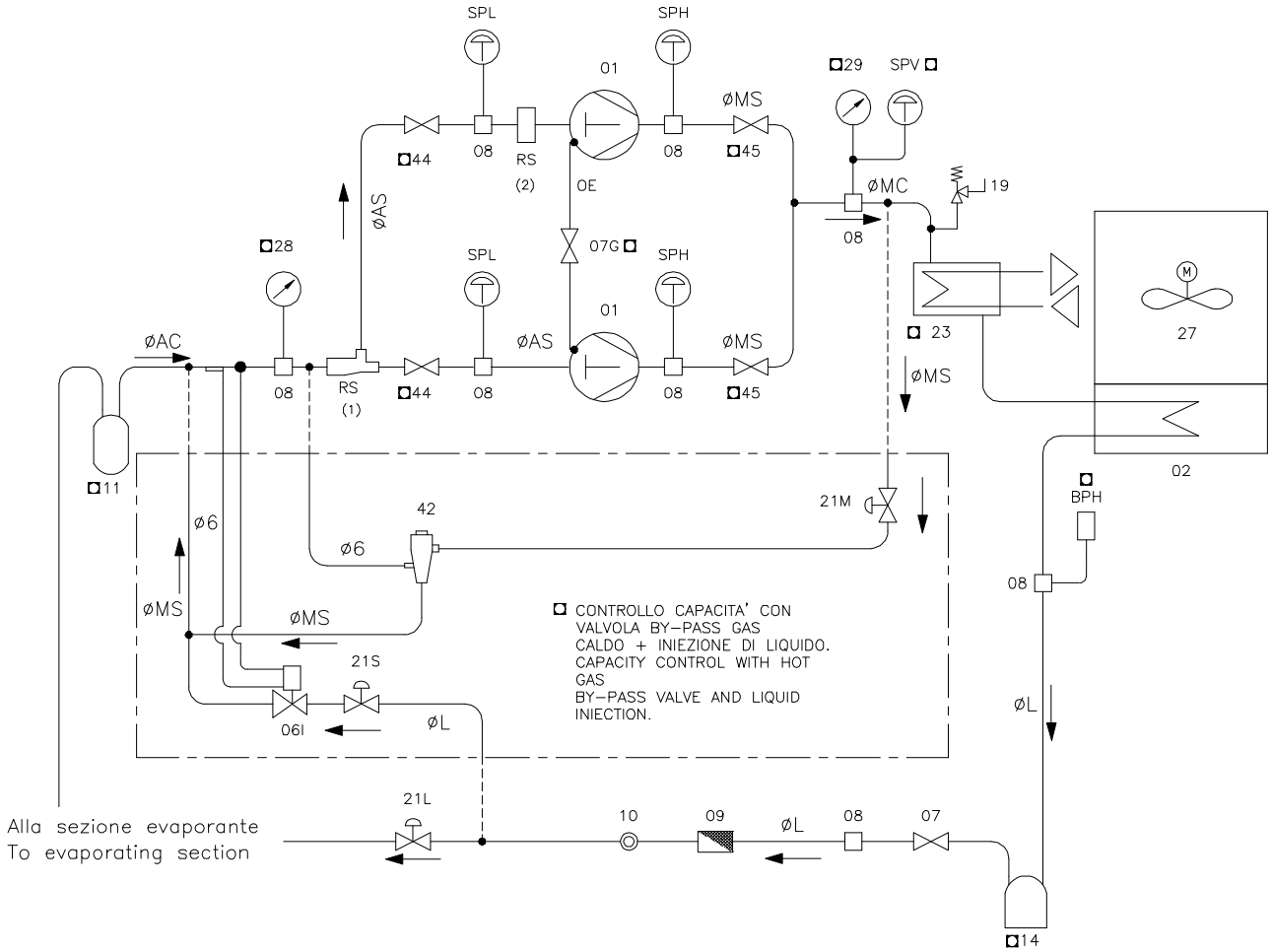
(1) SOLO SU MODELLI 3.2-9.2
ONLY MOD. 3.2-9.2

(2) SOLO SU MODELLO 12.2 NEL COMPR. SZ 240
ONLY MOD. 12.2 IN COPR.SZ 240

	AC	AS	MC	MS	L
3.2	35	28	22	18	16
4.2	35	35	22	22	18
5.2	42	28	22	18	18
6.2	42	35-28	28	22-18	22
7.2	42	35	28	22	22
8.2	42	35	28	22	22
9.2	54	42	35	28	28
10.2	54	42	35	28	28
12.2	54	42	35	28	28
13.2	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002/LE - MODELS 14.4 - 26.4



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE	CONDENSER
06I	VALVOLA TERMOST. INIEZ. LIQUIDO	THERMOST. VALVE FOR LIQUID INJECT.
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL' OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA '	MOISTURE INDICATOR SIGHT GLASS
11	SEPARATORE DI ASPIRAZIONE	SUCTION LINE ACCUMULATOR
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
21M	VALVOLA SOLENOIDE CONTROLLO EVAP.	EVAP. CONTROL SOLENOID VALVE
21S	VALVOLA SOLENOIDE INIEZ. DEL LIQ. COMPRESS.	COMPRESS. LQUID INJECTION SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
42	VALVOLA CONTROLLO EVAPORAZIONE	EVAPORATING CONTROL VALVE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BPH	TRASDUTTORE DI ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
RS	RESTRICTOR	RESTRICTOR
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH
SPL	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE SWITCH
SPV	PRESSOSTATO VENTILATORI	FAN PRESSURE SWITCH

□ OPZIONALE/OPTIONAL

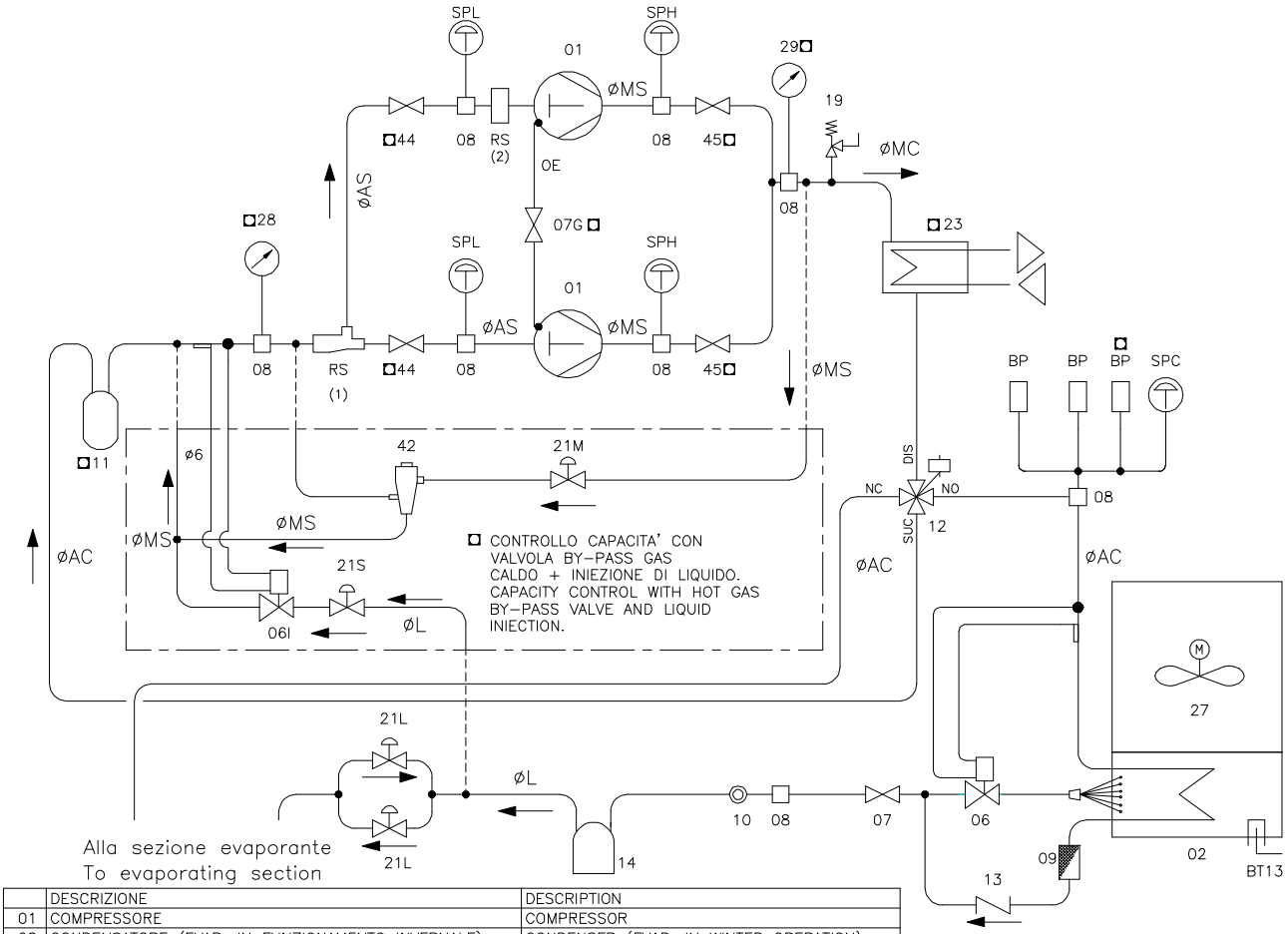
(1) SOLO SU MODELLI 14.4–18.4
ONLY MOD. 14.4–18.4

(2) SOLO SU MODELLO 24.4 NEL COMPR. SZ 240
ONLY MOD. 24.4 IN COPR.SZ 240

	AC	AS	MC	MS	L
14.4	42	35	28	22	22
16.4	42	35	28	22	22
18.4	54	42	35	28	28
20.4	54	42	35	28	28
24.4	54	42	35	28	28
26.4	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002/LE/HP - MODELS 3.2 - 13.2



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE (EVAP. IN FUNZIONAMENTO INVERNALE)	CONDENSER (EVAP. IN WINTER OPERATION)
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
06I	VALVOLA TERMOST. INIEZ. LIQUIDO	THERMOST. VALVE FOR LIQUID INJECT.
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL'OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA'	MOISTURE INDICATOR SIGHT GLASS
11	SEPARATORE DI ASPIRAZIONE	SUCTION LINE ACCUMULATOR
12	VALVOLA A INVERSIONE DI CICLO	REVERSE CYCLE VALVE
13	VALVOLA DI RITEGNO LINEA DEL LIQUIDO	LIQUID LINE CHECK VALVE
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
21M	VALVOLA SOLENOIDE CONTROLLO EVAP.	EVAP. CONTROL SOLENOID VALVE
21S	VALVOLA SOLENOIDE INIEZ. DEL LIQ. COMPRESS.	COMPRESS. LQUID INJECTION SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
42	VALVOLA CONTROLLO EVAPORAZIONE	EVAPORATING CONTROL VALVE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BP	TRASDUTTORE DI PRESSIONE	PRESSURE TRANSDUCER
BT13	SONDA TERMOSTATO BATTERIA	BATTERY THERMOSTAT PROEBE
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
RS	RESTRICTOR	RESTRICTOR
SPC	PRESSOSTATO ALTA SBRINAMENTO AUTOMATICO	DEFROST HIGH PRESSURE SWITCH
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH
SPL	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE SWITCH

□ OPZIONALE-OPTIONAL

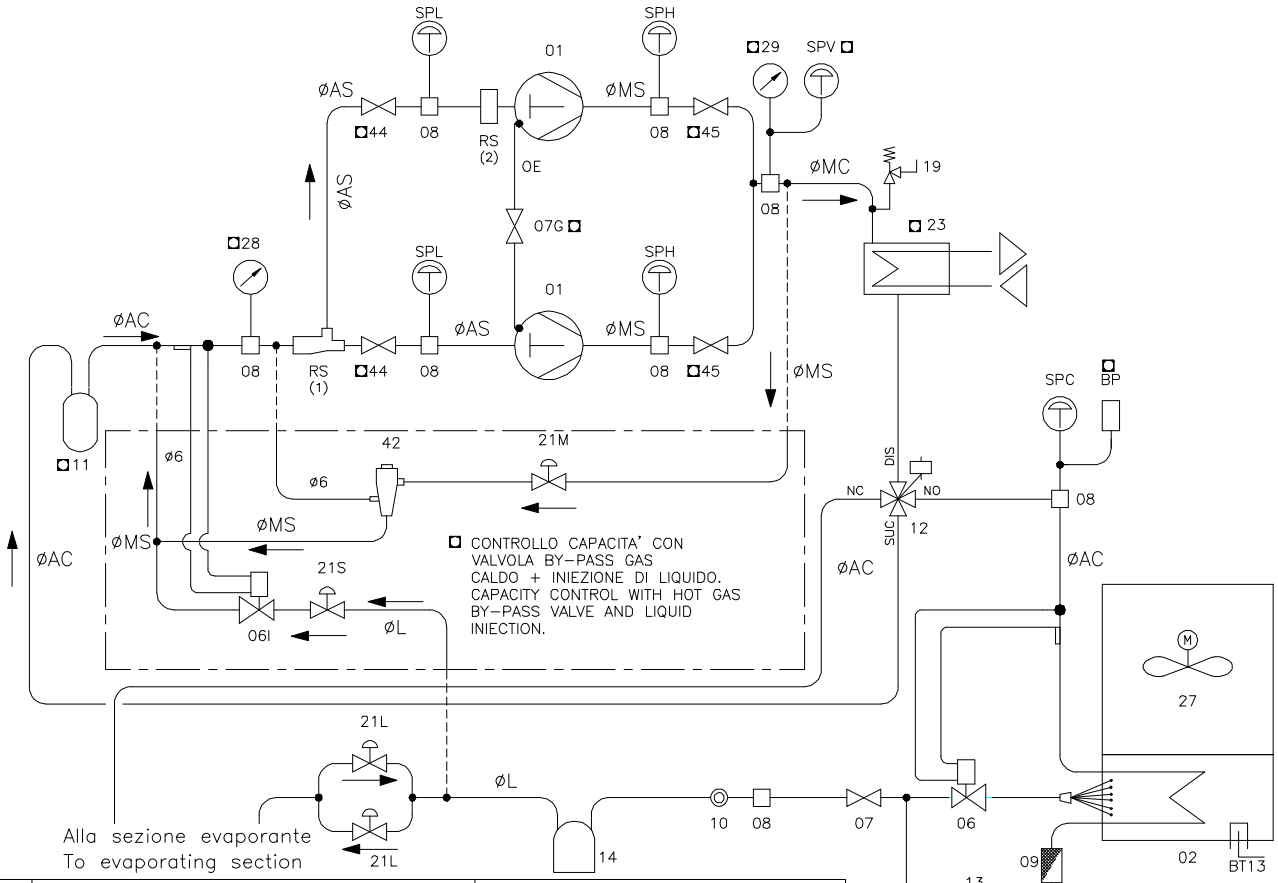
(1) SOLO SU MODELLI 3.2-9.2
ONLY MOD. 3.2-9.2

(2) SOLO SU MOD. 12.2 NEL COMPR. SZ 240
ONLY MOD. 12.2 IN COMPR.SZ 240

	AC	AS	MC	MS	L
3.2	35	28	22	18	16
4.2	35	35	22	22	18
5.2	35	28	22	18	18
6.2	42	35-28	28	22-18	22
7.2	42	35	28	22	22
8.2	42	35	28	22	22
9.2	54	42	35	28	28
10.2	54	42	35	28	28
12.2	54	42	35	28	28
13.2	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002/LE/HP - MODELS 14.4 - 26.4



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE (EVAP. IN FUNZIONAMENTO INVERNALE)	CONDENSER (EVAP. IN WINTER OPERATION)
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
06I	VALVOLA TERMOST. INIEZ. LIQUIDO	THERMOST. VALVE FOR LIQUID INJECT.
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL'OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA'	MOISTURE INDICATOR SIGHT GLASS
11	SEPARATORE DI ASPIRAZIONE	SUCTION LINE ACCUMULATOR
12	VALVOLA A INVERSIONE DI CICLO	REVERSE CYCLE VALVE
13	VALVOLA DI RITEGNO LINEA DEL LIQUIDO	LIQUID LINE CHECK VALVE
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
21M	VALVOLA SOLENOIDE CONTROLLO EVAP.	EVAP. CONTROL SOLENOID VALVE
21S	VALVOLA SOLENOIDE INIEZ. DEL LIQ. COMPRESS.	COMPRESS. LQUID INJECTION SOLENOID VALVE
23	DESURRISCALDATORE	DESUPERHEATER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
42	VALVOLA CONTROLLO EVAPORAZIONE	EVAPORATING CONTROL VALVE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BP	TRASDUTTORE DI PRESSIONE	PRESSURE TRANSDUCER
BT13	SONDA TERMOSTATO BATTERIA	BATTERY THERMOSTAT PROEBE
0E	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
RS	RESTRICTOR	RESTRICTOR
SPC	PRESSOSTATO ALTA SBRINAMENTO AUTOMATICO	DEFROST HIGH PRESSURE SWITCH
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH
SPL	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE SWITCH
SPV	PRESSOSTATO VENTILATORI	FAN PRESSURE SWITCH

□ OPZIONALE-OPTIONAL

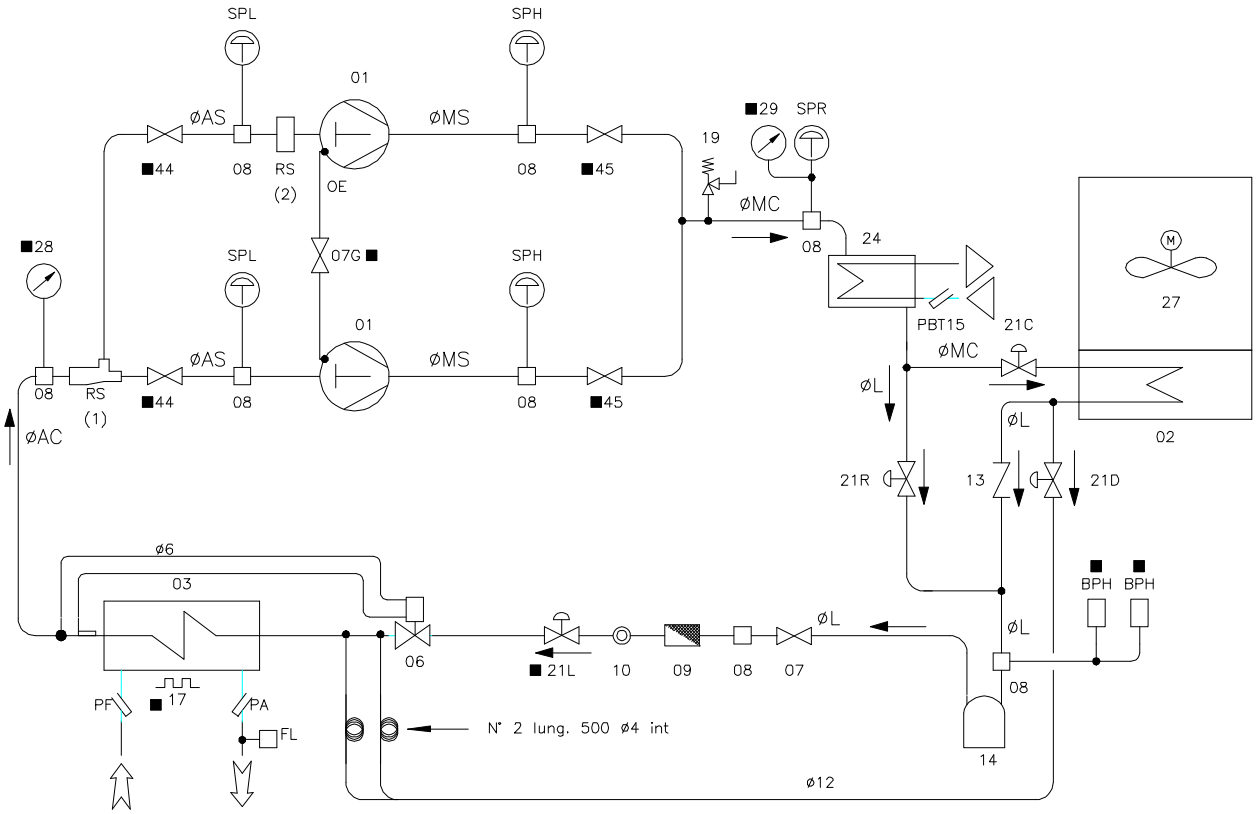
(1) SOLO SU MODELLI 14.4-18.4
ONLY MOD. 14.4-18.4

(2) SOLO SU MOD. 24.4 NEL COMPR. SZ 240
ONLY MOD. 24.4 IN COPR. SZ 240

	AC	AS	MC	MS	L
14.4	42	35	28	22	22
16.4	42	35	28	22	22
18.4	54	42	35	28	28
20.4	54	42	35	28	28
24.4	54	42	35	28	28
26.4	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002/DC - MODELS 3.2 - 13.2



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE	CONDENSER
03	EVAPORATORE	EVAPORATOR
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL' OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA '	MOISTURE INDICATOR SIGHT GLASS
13	VALVOLA DI RITEGNO LINEA DEL LIQUIDO	LIQUID LINE CHECK VALVE
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21C	VALVOLA SOLENOIDE CONDENSATORE	CNSENSER SOLENOID VALVE
21D	VALVOLA SOLENOIDE PER SCARICO CODENS.	CONDENS. DISCHARGE SOLENOID VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
21R	VALVOLA SOLENOIDE CONDENS. DI RECUP.	RECOVERY CONDENSER SOLENOID VALVE
24	SCAMBIATORE A RECUPERO TOTALE	TOTAL RECOVERY EXCHANGER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BPH	TRASDUTTORE DI ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER
FL	FLUSSOSTATO	FLOW SWITCH
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PBT15	POZZETTO PER SONDA DI RECUPERO	VERY PROBE POCKETCHANGER
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RS	RESTRICTOR	RESTRICTOR
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH
SPL	PRESSOSTATO BASSA PRESSIONE	LOW PRESSURE SWITCH
SPR	PRESSOSTATO ALTA RECUPERO	RECOVERY PRESSURE SWITCH

■ OPZIONALE–OPTIONAL

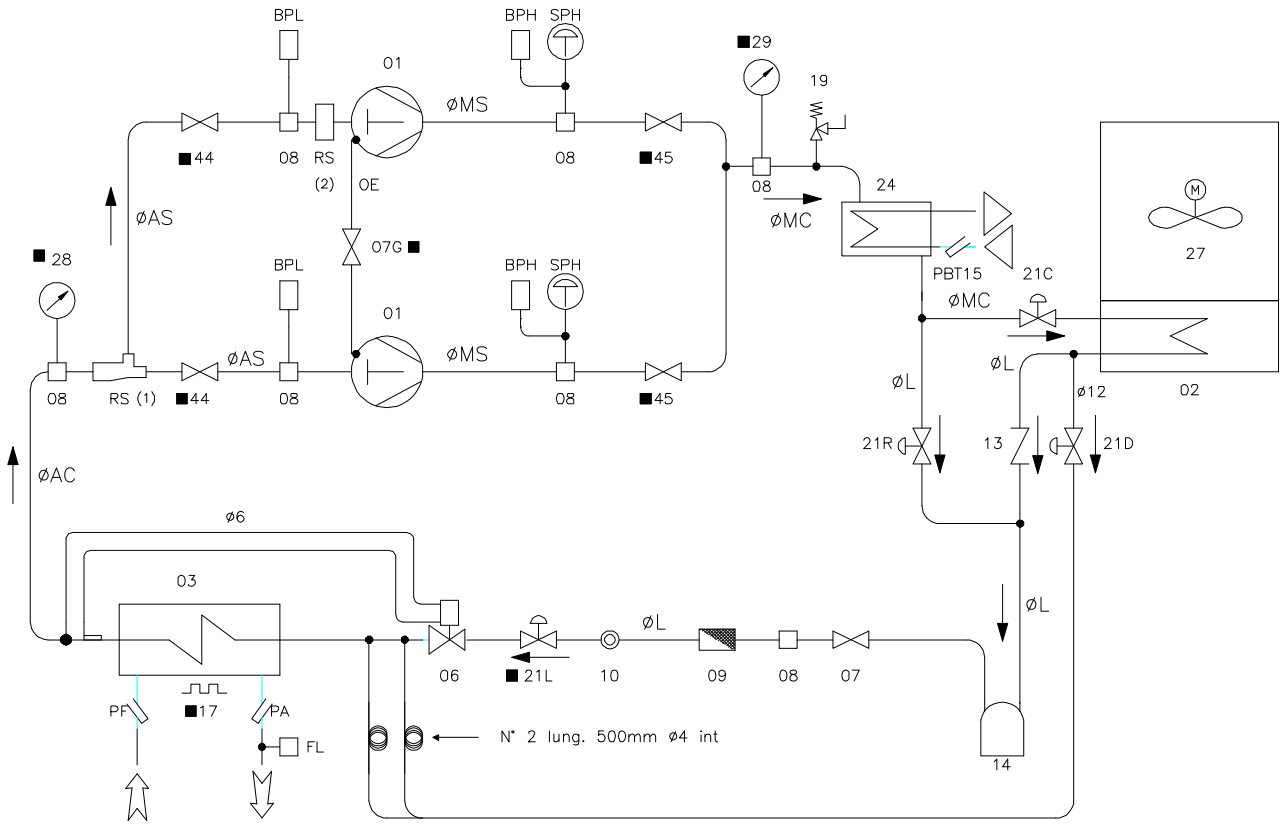
(1) SOLO SU MODELLI 3.2–9.2
ONLY MOD. 3.2–9.2

(2) SOLO SU MODELLO 12.2 NEL COMPR. SZ 240
ONLY MOD. 12.2 IN COPR.SZ 240

	AC	AS	MC	MS	L
3.2	35	28	22	18	16
4.2	35	22	22	22	18
5.2	42	28	22	18	18
6.2	42	35–28	28	22–18	22
7.2	42	35	28	22	22
8.2	42	35	28	22	22
9.2	54	42	35	28	28
10.2	54	42	35	28	28
12.2	54	42	35	28	28
13.2	54	42	35	28	28

REFRIGERANT CIRCUIT

ZETA 2002/DC - MODELS 14.4 - 26.4



	DESCRIZIONE	DESCRIPTION
01	COMPRESSORE	COMPRESSOR
02	CONDENSATORE	CONDENSER
03	EVAPORATORE	EVAPORATOR
06	VALVOLA TERMOSTATICA	THERMOSTATIC VALVE
07	RUBINETTO LINEA DEL LIQUIDO	LIQUID LINE VALVE
07G	RUBINETTO LINEA DELL'OLIO	OIL LINE VALVE
08	PRESA DI CARICA	CHARGING CONNECTION
09	FILTRO	FILTER
10	INDICATORE DI UMIDITA '	MOISTURE INDICATOR SIGHT GLASS
13	VALVOLA DI RITEGNO LINEA DEL LIQUIDO	LIQUID LINE CHECK VALVE
14	RICEVITORE DI LIQUIDO	LIQUID RECEIVER
17	RESISTENZA ELETTRICA	ELECTRIC HEATER
19	VALVOLA DI SICUREZZA DI ALTA PRESSIONE	HIGH PRESSURE SAFETY VALVE
21C	VALVOLA SOLENOIDE CONDENSATORE	CONDENSER SOLENOID VALVE
21D	VALVOLA SOLENOIDE PER SCARICO CODENS.	CONDENS. DISCHARGE SOLENOID VALVE
21R	VALVOLA SOLENOIDE CONDENS. DI RECUP.	RECOVERY CONDENSER SOLENOID VALVE
21L	VALVOLA SOLENOIDE	SOLENOID VALVE
24	SCAMBIATORE A RECUPERO TOTALE	TOTAL RECOVERY EXCHANGER
27	ELETTROVENTOLA	ELECTRIC FAN
28	MANOMETRO BASSA PRESSIONE	LOW PRESSURE GAUGE
29	MANOMETRO ALTA PRESSIONE	HIGH PRESSURE GAUGE
44	RUBINETTO COMPRESSORE BASSA PRESSIONE	LOW PRESSURE SHUT-OFF VALVE
45	RUBINETTO COMPRESSORE ALTA PRESSIONE	HIGH PRESSURE SHUT-OFF VALVE
BPH	TRASDUTTORE DI ALTA PRESSIONE	HIGH PRESSURE TRANSDUCER
BPL	TRASDUTTORE DI BASSA PRESSIONE	LOW PRESSURE TRANSDUCER
FL	FLUSSOSTATO	FLOW SWITCH
OE	EQUALIZZAZIONE OLIO	OIL EQUALIZATION
PA	POZZETTO PER SONDA ANTIGELO	LOW WATER TEMPERATURE PROBE POCKET
PBT15	POZZETTO PER SONDA DI RECUPERO	VERY PROBE POCKETCHANGER
PF	POZZETTO PER SONDA INGRESSO ACQUA	INLET PROBE POCKET
RS	RESTRICTOR	RESTRICTOR
SPH	PRESSOSTATO ALTA PRESSIONE	HIGH PRESSURE SWITCH

■ OPZIONALE–OPTIONAL

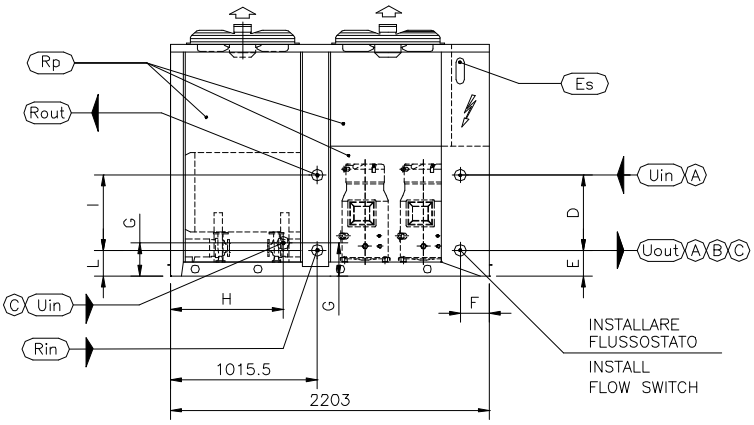
(1) SOLO SU MODELLI 14.4–18.4
ONLY MOD. 14.4–18.4

(2) SOLO SU MODELLO 24.4 NEL COMPR. SZ240
ONLY MOD. 24.4 IN COMPR. SZ240

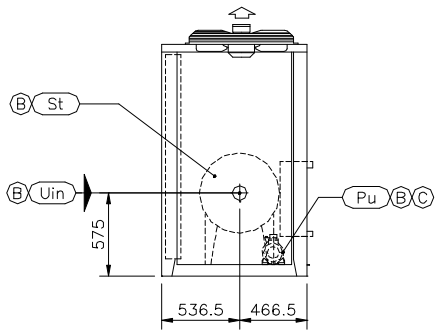
	AC	AS	MC	MS	L
14.4	42	35	28	22	22
16.4	42	35	28	22	22
18.4	54	42	35	28	28
20.4	54	42	35	28	28
24.4	54	42	35	28	28
26.4	54	42	35	28	28

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

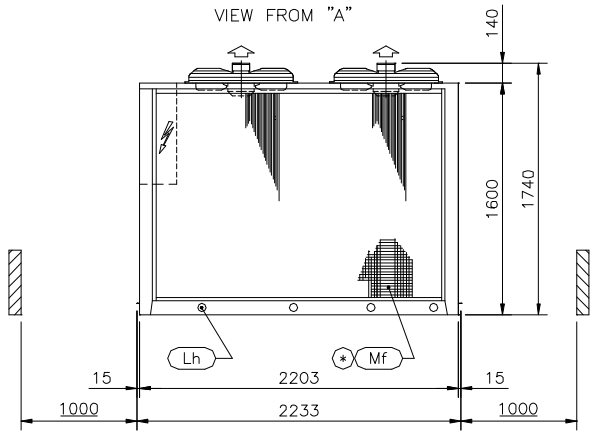
ZETA 2002 - ZETA 2002/HP - MODELS 3.2 - 8.2

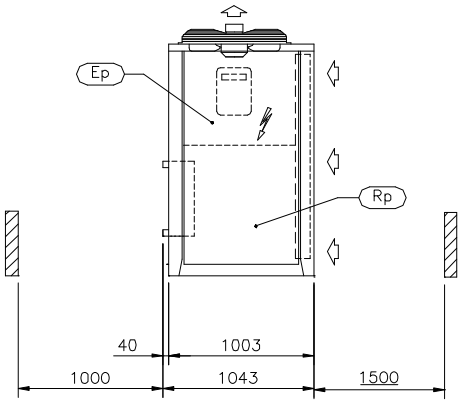


VISTA DA "A"
VIEW FROM "A"



VISTA DA "B"
VIEW FROM "B"





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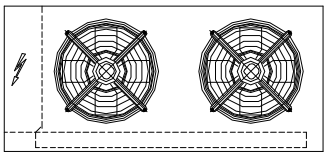


"B"

CONNESSIONI IDRAULICHE/HYDRAULIC CONNECTIONS

Ⓐ SENZA MODULO IDRAULICO
WITHOUT HYDRAULIC MODULE

Ⓑ MODULO IDRAULICO ST1PS–ST2PS–STS
HYDRAULIC MODULE ST1PS–ST2PS–STS

Ⓒ MODULO IDRAULICO ST1P–ST2P
HYDRAULIC MODULE ST1P–ST2P

MODELLO *MODEL*	D	E	F	H	G	Uin Ⓐ	Uin Ⓑ	Uin Ⓒ	Uout
3.2–4.2–5.2	466	300	127	720	220	G 1 1/4"M	G 2"M	G 2"F	G 1 1/4"M
6.2	466	300	127	783	230	G 1 1/4"M	G 2"M	G 2"F	G 1 1/4"M
7.2–8.2	519	180	200	783	230	G 2"M	G 2"M	G 2"F	G 2"M

	MODELLO *MODEL*	Rin	Rout	I	L
DC	3.2–5.2	G 1 1/4"M	G 1 1/4"M	466	233
	6.2–8.2	G 2"M	G 2"M	519	180
DS	3.2–8.2	G 1"F	G 1"F	250	180

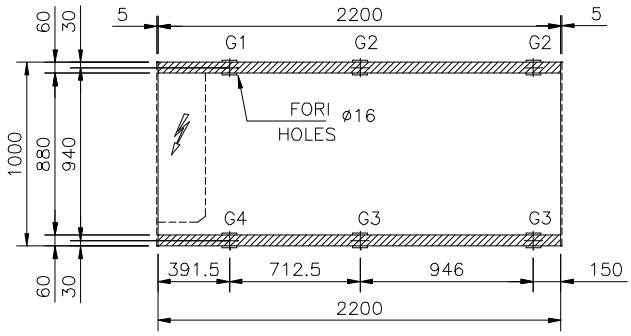
⇩	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES
Mf	FILTRI METALLICI METALLIC FILTER

Pu	POMPA PUMP
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
St	SERBATOIO DI ACCUMULO STORAGE TANK
Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET
Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET

*	OPTIONAL
Rin	INGRESSO ACQUA RECUPERO RECOVERY WATER INLET
Rout	USCITA ACQUA RECUPERO RECOVERY WATER OUTLET
▨	SPAZI DI INSTALLAZIONE CLEARANCES

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

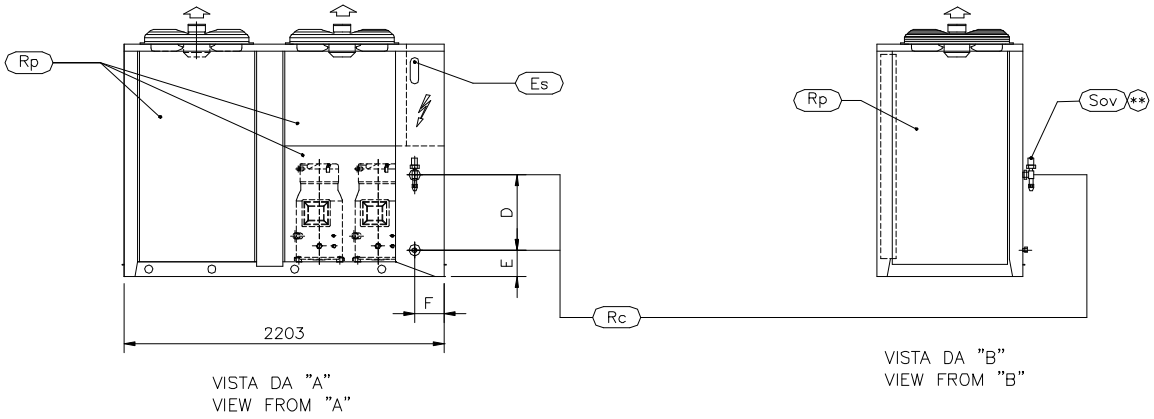
ZETA 2002 - ZETA 2002/HP - FOOTPRINT - MODELS 3.2 - 8.2

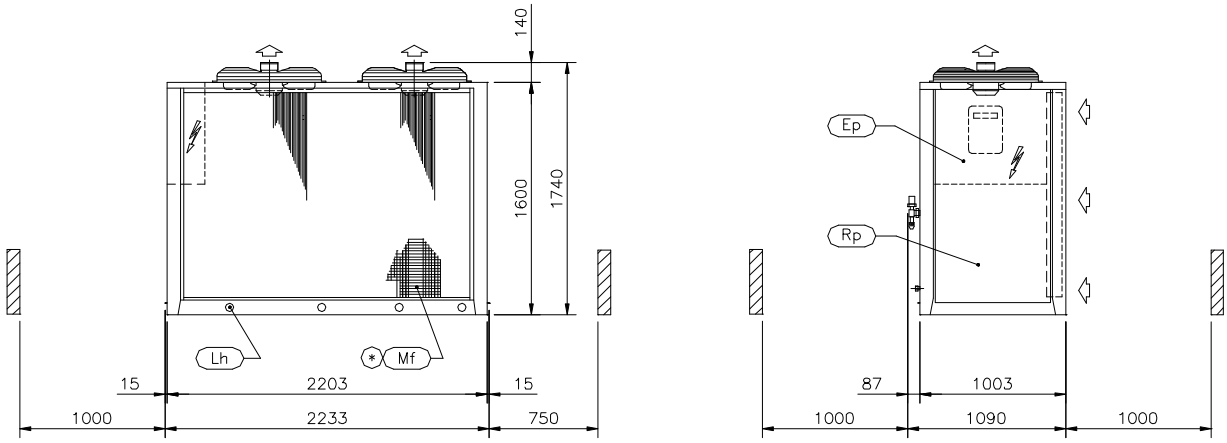


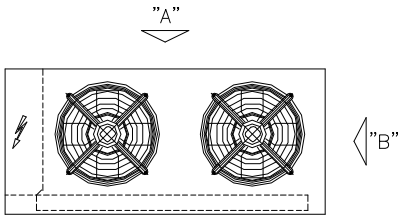
MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002 3.2	594	601	217	57	47	176
ZETA 2002 4.2	604	610	222	58	47	178
ZETA 2002 5.2	625	631	235	61	47	180
ZETA 2002 6.2	672	679	241	67	54	196
ZETA 2002 7.2	690	699	255	67	54	202
ZETA 2002 8.2	737	748	268	72	59	218
ZETA 2002/ST 1P-2P 3.2	644	649	215	73	58	172
ZETA 2002/ST 1P-2P 4.2	654	660	219	75	59	173
ZETA 2002/ST 1P-2P 5.2	674	680	231	78	59	175
ZETA 2002/ST 1P-2P 6.2	726	734	238	85	68	190
ZETA 2002/ST 1P-2P 7.2	744	753	251	86	67	196
ZETA 2002/ST 1P-2P 8.2	791	799	261	91	73	210
ZETA 2002/DC/DS 3.2	644	655	226	69	55	181
ZETA 2002/DC/DS 4.2	658	671	234	71	56	183
ZETA 2002/DC/DS 5.2	683	699	248	76	57	185
ZETA 2002/DC/DS 6.2	735	751	265	78	61	208
ZETA 2002/DC/DS 7.2	758	775	280	80	61	213
ZETA 2002/DC/DS 8.2	810	830	295	86	67	229
ZETA 2002/DC/DS/ST 1P-2P 3.2	693	704	225	84	67	177
ZETA 2002/DC/DS/ST 1P-2P 4.2	703	715	231	85	67	180
ZETA 2002/DC/DS/ST 1P-2P 5.2	732	749	247	92	68	182
ZETA 2002/DC/DS/ST 1P-2P 6.2	789	806	264	95	74	204
ZETA 2002/DC/DS/ST 1P-2P 7.2	812	829	279	97	73	210
ZETA 2002/DC/DS/ST 1P-2P 8.2	810	830	295	86	67	229
ZETA 2002/HP 3.2	638	644	232	58	49	198
ZETA 2002/HP 4.2	648	653	238	58	49	201
ZETA 2002/HP 5.2	669	677	251	62	50	202
ZETA 2002/HP 6.2	716	724	258	67	57	218
ZETA 2002/HP 7.2	734	741	271	67	56	224
ZETA 2002/HP 8.2	781	790	284	72	61	240
ZETA 2002/HP/ST 1P-2P 3.2	689	696	233	73	61	195
ZETA 2002/HP/ST 1P-2P 4.2	699	706	238	74	61	198
ZETA 2002/HP/ST 1P-2P 5.2	719	726	251	77	61	199
ZETA 2002/HP/ST 1P-2P 6.2	770	776	258	83	69	214
ZETA 2002/HP/ST 1P-2P 7.2	788	795	271	84	68	220
ZETA 2002/HP/ST 1P-2P 8.2	835	846	284	89	74	236
ZETA 2002/HP/DS 3.2	643	650	232	58	50	202
ZETA 2002/HP/DS 4.2	654	663	238	59	51	205
ZETA 2002/HP/DS 5.2	675	683	251	62	51	206
ZETA 2002/HP/DS 6.2	723	731	258	67	58	223
ZETA 2002/HP/DS 7.2	741	752	271	68	58	229
ZETA 2002/HP/DS 8.2	790	802	284	73	63	246
ZETA 2002/HP/DS/ST 1P-2P 3.2	693	699	232	73	62	197
ZETA 2002/HP/DS/ST 1P-2P 4.2	704	713	238	74	63	201
ZETA 2002/HP/DS/ST 1P-2P 5.2	724	733	250	77	63	203
ZETA 2002/HP/DS/ST 1P-2P 6.2	776	785	257	84	71	218
ZETA 2002/HP/DS/ST 1P-2P 7.2	794	804	270	85	70	224
ZETA 2002/HP/DS/ST 1P-2P 8.2	843	854	283	89	76	241
ZETA 2002/ST 1PS-2PS-S 3.2	724	949	220	160	121	167
ZETA 2002/ST 1PS-2PS-S 4.2	734	959	225	161	121	170
ZETA 2002/ST 1PS-2PS-S 5.2	755	981	236	165	121	173
ZETA 2002/ST 1PS-2PS-S 6.2	807	1031	244	170	130	187
ZETA 2002/ST 1PS-2PS-S 7.2	825	1051	257	171	129	194
ZETA 2002/ST 1PS-2PS-S 8.2	868	1096	270	175	134	208
ZETA 2002/HP/ST 1PS-2PS-S 3.2	754	979	230	159	125	181
ZETA 2002/HP/ST 1PS-2PS-S 4.2	764	990	236	160	125	184
ZETA 2002/HP/ST 1PS-2PS-S 5.2	785	1010	247	164	124	187
ZETA 2002/HP/ST 1PS-2PS-S 6.2	836	1061	256	169	133	201
ZETA 2002/HP/ST 1PS-2PS-S 7.2	854	1080	268	170	132	208
ZETA 2002/HP/ST 1PS-2PS-S 8.2	902	1128	283	174	137	223

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002/LE - ZETA 2002 /LE/HP - MODELS 3.2 - 8.2





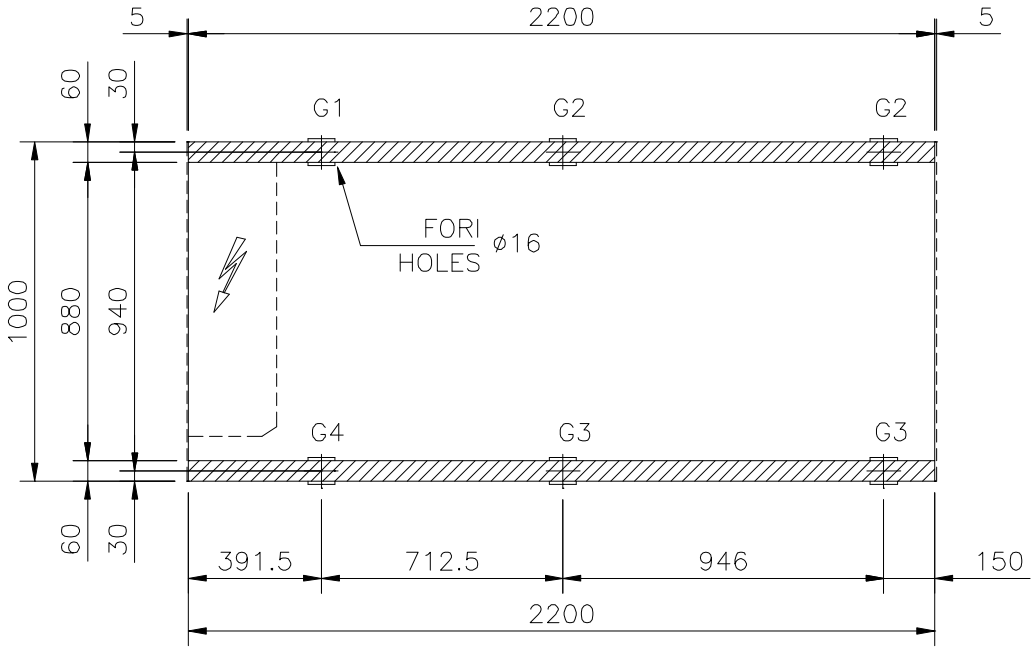


MODELLO *MODEL*	D	E	F
3.2–6.2	466	300	77
7.2–8.2	519	180	108

⇳	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW	Mf	FILTRI METALLICI METALLIC FILTER	▨	SPAZI DI INSTALLAZIONE CLEARANCES
Ep	QUADRO ELETTRICO ELECTRICAL PANEL	Rc	CONNESSIONI REFRIGERANTE REFRIGERANTS CONNECTIONS	*	OPTIONAL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET	Rp	PANNELLO ASPORTABILE REMOVABLE PANEL	**	SOLO PER DELTA ONLY FOR DELTA
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES	Sov	RUBINETTO DI ASPIRAZIONE LOW–PRESSURE SHUT–OFF VALVE		

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002/LE - ZETA 2002 /LE/HP - FOOTPRINT - MODELS 3.2 - 8.2

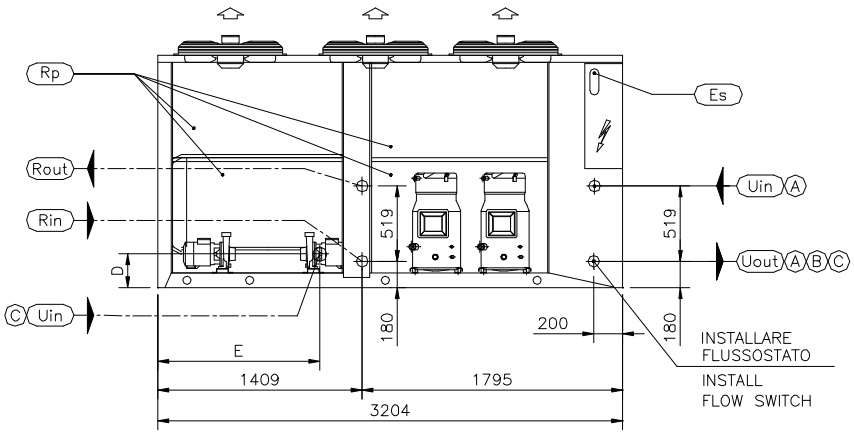


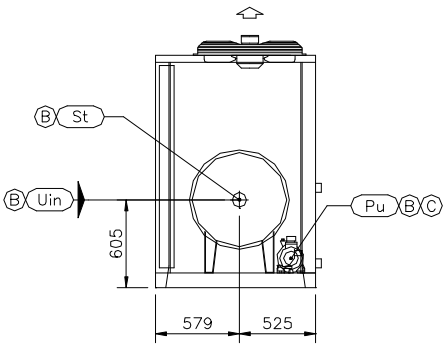
IMPRONTA A TERRA / FOOTPRINT

MODELLO MODEL	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002/LE 3.2	582	200	57	49	170
ZETA 2002/LE 4.2	592	206	58	49	172
ZETA 2002/LE 5.2	601	208	61	50	171
ZETA 2002/LE 6.2	649	214	66	58	187
ZETA 2002/LE 7.2	665	223	67	58	192
ZETA 2002/LE 8.2	705	232	71	63	205
ZETA 2002/LE/HP 3.2	626	216	58	51	192
ZETA 2002/LE/HP 4.2	634	221	58	51	195
ZETA 2002/LE/HP 5.2	646	224	61	53	194
ZETA 2002/LE/HP 6.2	692	231	66	60	209
ZETA 2002/LE/HP 7.2	708	240	67	60	214
ZETA 2002/LE/HP 8.2	750	249	72	65	227

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

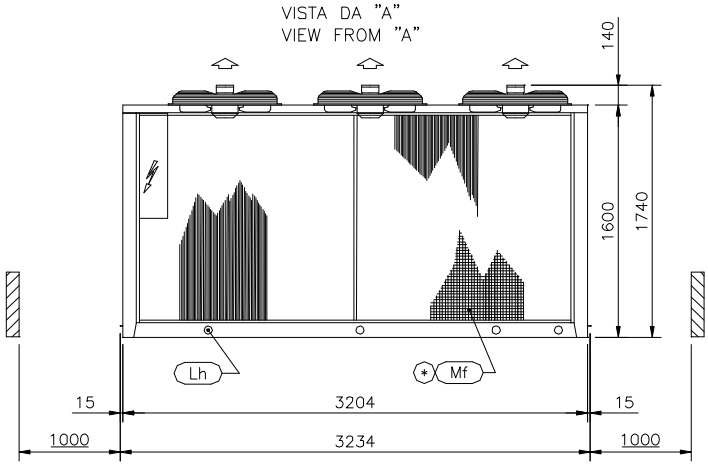
ZETA 2002 - ZETA 2002/HP - MODELS 9.2 - 13.2

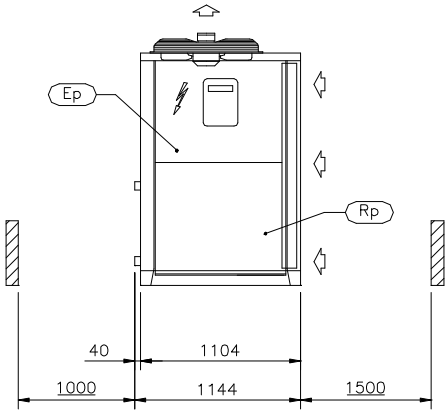


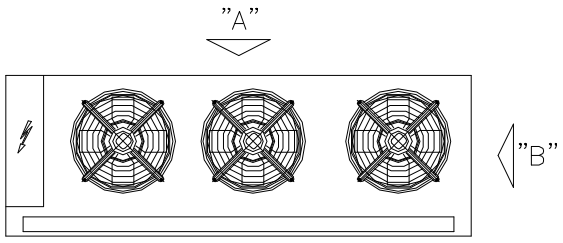


VISTA DA "B"
VIEW FROM "B"

VISTA DA "A"
VIEW FROM "A"







CONNESSIONI IDRAULICHE/HYDRAULIC CONNECTIONS

Ⓐ SENZA MODULO IDRAULICO
WITHOUT HYDRAULIC MODULE

Ⓑ MODULO IDRAULICO ST1PS–ST2PS–STS
HYDRAULIC MODULE ST1PS–ST2PS–STS

Ⓒ MODULO IDRAULICO ST1P–ST2P
HYDRAULIC MODULE ST1P–ST2P

Uin		Uout	Rin	Rout
Ⓐ Ⓑ	Ⓒ			
G 2"M	G 2"F	G 2"M	G 2"M	G 2"M

MOD.	D	E
9–10	230	1068.5
12–13	242	1118

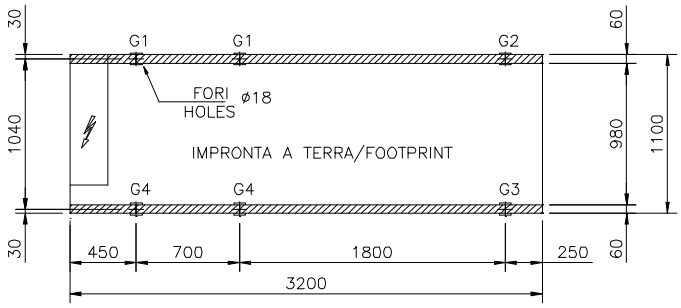
⇳	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES
Mf	FILTRI METALLICI METALLIC FILTER

Pu	POMPA PUMP
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
St	SERBATOIO DI ACCUMULO STORAGE TANK
Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET
Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET

*	OPTIONAL
Rin	INGRESSO ACQUA RECUPERO RECOVERY WATER INLET
Rout	USCITA ACQUA RECUPERO RECOVERY WATER OUTLET
▨	SPAZI DI INSTALLAZIONE CLEARANCES

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

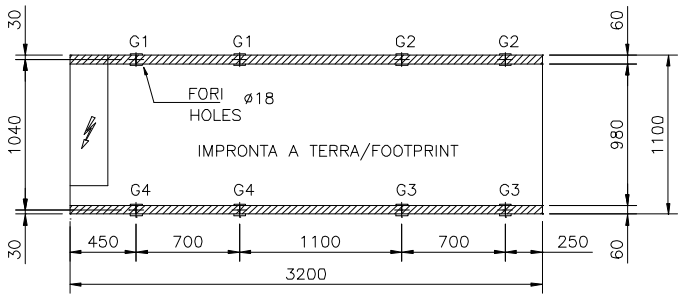
ZETA 2002 - ZETA 2002/HP - FOOTPRINT - MODELS 9.2 - 13.2



Ⓐ SENZA MODULO IDRAULICO
WITHOUT HYDRAULIC MODULE

Ⓒ MODULO IDRAULICO ST1P–ST2P
HYDRAULIC MODULE ST1P–ST2P

MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002 9.2	981	993	223	106	85	178
ZETA 2002 10.2	1058	1068	245	118	90	185
ZETA 2002 12.2	1124	1136	258	123	95	201
ZETA 2002 13.2	1158	1169	269	127	96	204
ZETA 2002/ST 1P-2P 9.2	1035	1045	228	128	101	180
ZETA 2002/ST 1P-2P 10.2	1112	1122	251	141	105	187
ZETA 2002/ST 1P-2P 12.2	1177	1190	264	145	111	203
ZETA 2002/ST 1P-2P 13.2	1212	1223	275	149	112	206
ZETA 2002/DC-DS 9.2	1072	1095	248	130	97	186
ZETA 2002/DC-DS 10.2	1159	1184	274	147	103	193
ZETA 2002/DC-DS 12.2	1232	1261	290	154	111	208
ZETA 2002/DC-DS 13.2	1272	1301	303	161	112	211
ZETA 2002/DC-DS/ST 1P-2P 9.2	1146	1168	259	153	113	192
ZETA 2002/DC-DS/ST 1P-2P 10.2	1233	1258	284	170	120	200
ZETA 2002/DC-DS/ST 1P-2P 12.2	1305	1333	300	178	127	214
ZETA 2002/DC-DS/ST 1P-2P 13.2	1346	1378	314	185	129	218
ZETA 2002/HP 9.2	1027	1037	231	106	87	191
ZETA 2002/HP 10.2	1104	1114	253	118	92	199
ZETA 2002/HP 12.2	1170	1180	266	122	98	214
ZETA 2002/HP 13.2	1204	1217	278	126	99	218
ZETA 2002/HP/ST 1P-2P 9.2	1081	1091	237	127	104	193
ZETA 2002/HP/ST 1P-2P 10.2	1158	1168	259	140	108	201
ZETA 2002/HP/ST 1P-2P 12.2	1223	1234	272	144	114	216
ZETA 2002/HP/ST 1P-2P 13.2	1258	1271	284	148	115	220
ZETA 2002/HP/DS 9.2	1052	1068	240	116	92	190
ZETA 2002/HP/DS 10.2	1160	1177	262	132	105	208
ZETA 2002/HP/DS 12.2	1195	1211	275	132	103	213
ZETA 2002/HP/DS 13.2	1234	1253	288	139	104	217
ZETA 2002/HP/DS/ST 1P-2P 9.2	1106	1122	246	138	108	192
ZETA 2002/HP/DS/ST 1P-2P 10.2	1183	1199	268	151	112	200
ZETA 2002/HP/DS/ST 1P-2P 12.2	1248	1265	281	155	118	215
ZETA 2002/HP/DS/ST 1P-2P 13.2	1288	1306	294	162	120	218

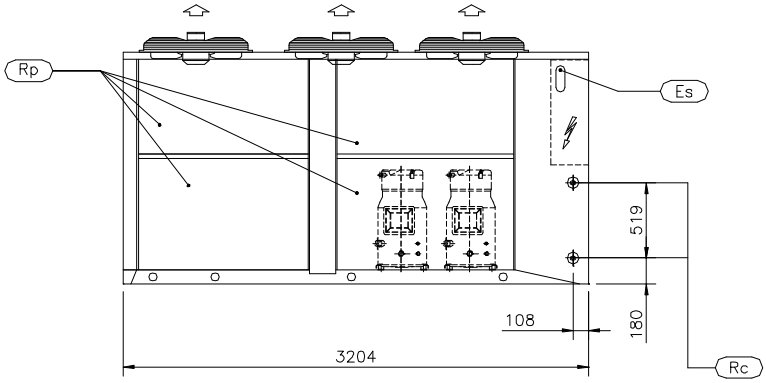


Ⓑ MODULO IDRAULICO ST1PS–ST2PS–STS
HYDRAULIC MODULE ST1PS–ST2PS–STS

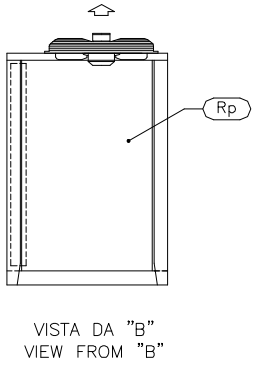
MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002/ST 1PS-2PS-S 9.2	1142	1594	230	214	170	183
ZETA 2002/ST 1PS-2PS-S 10.2	1219	1670	249	223	171	192
ZETA 2002/ST 1PS-2PS-S 12.2	1275	1728	261	224	175	204
ZETA 2002/ST 1PS-2PS-S 13.2	1309	1762	271	227	175	208
ZETA 2002/HP/ST 1PS-2PS-S 9.2	1178	1630	234	208	176	197
ZETA 2002/HP/ST 1PS-2PS-S 10.2	1255	1706	257	221	173	202
ZETA 2002/HP/ST 1PS-2PS-S 12.2	1321	1776	271	223	178	216
ZETA 2002/HP/ST 1PS-2PS-S 13.2	1355	1808	281	226	177	220

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002/LE - ZETA 2002/LE/HP - MODELS 9.2 - 13.2



VISTA DA "A"
VIEW FROM "A"



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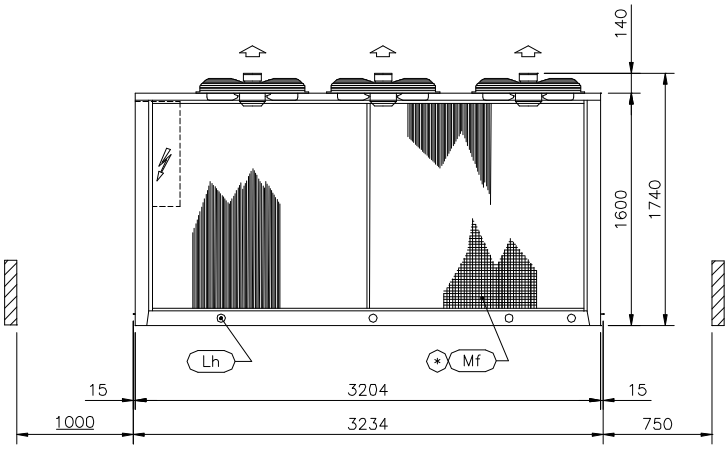
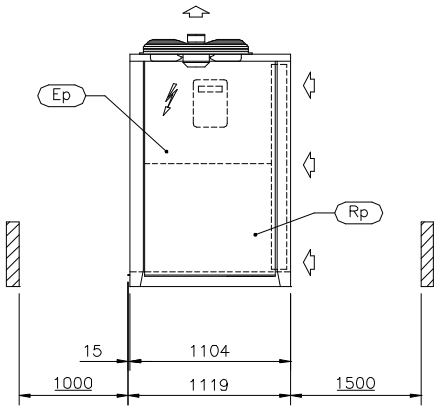
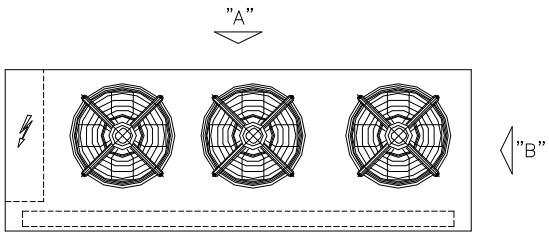


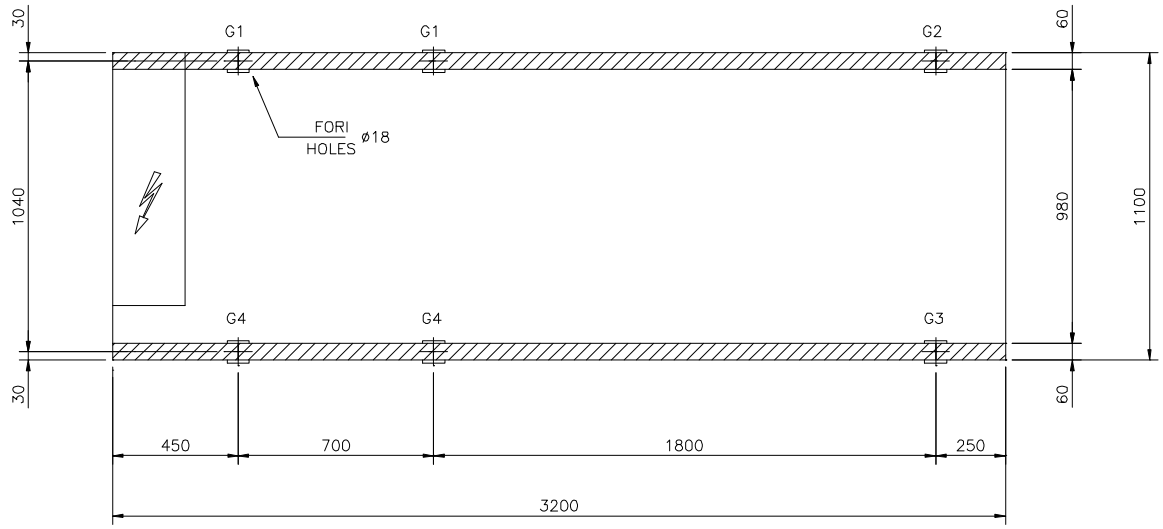




⇳	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW	Lh	FORI DI SOLLEVAMENTO LIFTING HOLES	Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
Ep	QUADRO ELETTRICO ELECTRICAL PANEL	Mf	FILTRI METALLICI METALLIC FILTER	▨	SPAZI DI INSTALLAZIONE CLEARANCES
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET	Rc	CONNESSIONI REFRIGERANTE REFRIGERANTS CONNECTIONS	*	OPTIONAL

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002/LE - ZETA 2002/LE/HP - FOOTPRINT - MODELS 9.2 - 13.2

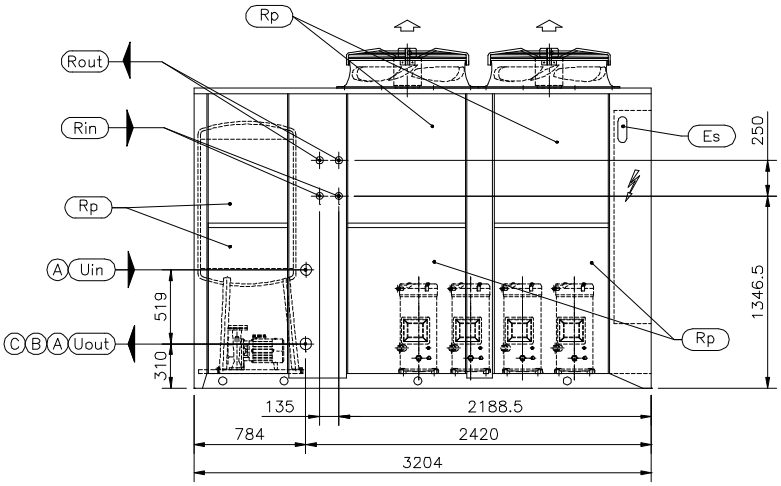


IMPRONTA A TERRA / FOOTPRINT

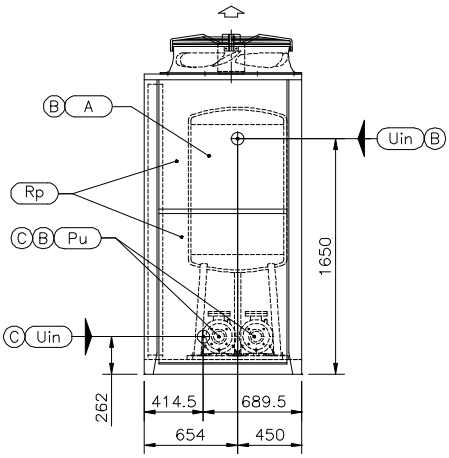
MODELLO MODEL	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002/LE 9.2	945	200	111	94	170
ZETA 2002/LE 10.2	1022	222	123	99	178
ZETA 2002/LE 12.2	1084	233	128	106	192
ZETA 2002/LE 13.2	1113	241	133	108	195
ZETA 2002/LE/HP 9.2	993	209	110	97	184
ZETA 2002/LE/HP 10.2	1068	231	122	102	191
ZETA 2002/LE/HP 12.2	1129	241	127	108	206
ZETA 2002/LE/HP 13.2	1160	250	132	110	209

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

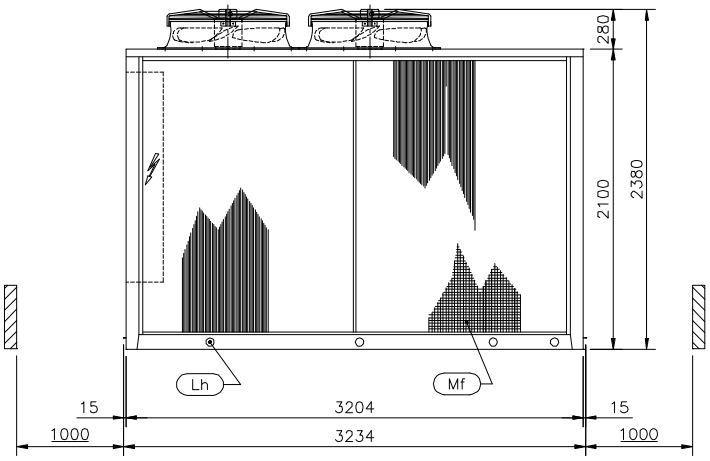
ZETA 2002 - ZETA 2002/HP - MODELS 14.4 - 16.4

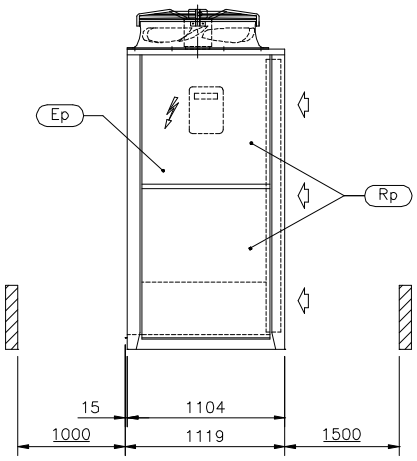


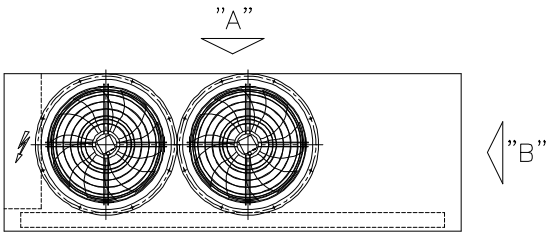
VISTA DA "A"
VIEW FROM "A"



VISTA DA "B"
VIEW FROM "B"







CONNESSIONI IDRAULICHE/HYDRAULIC CONNECTIONS

Ⓐ SENZA MODULO IDRAULICO
WITHOUT HYDRAULIC MODULE

Ⓑ MODULO IDRAULICO ST1PS–ST2PS–STS
HYDRAULIC MODULE ST1PS–ST2PS–STS

Ⓒ MODULO IDRAULICO ST1P–ST2P
HYDRAULIC MODULE ST1P–ST2P

Uin			Uout	Rout	Rin
Ⓐ	Ⓑ	Ⓒ			
G 3"F	G 3"F	G 2 1/2"F	G 3"F	G 1"F	G 1"F

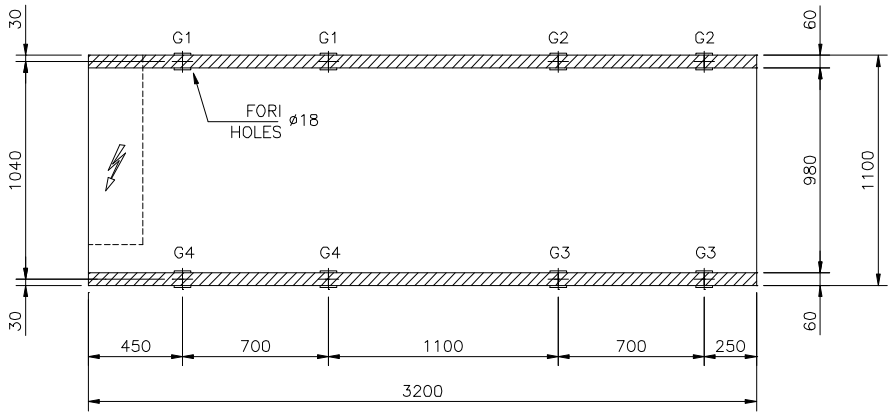
⇩	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES
Mf	FILTRI METALLICI METALLIC FILTER

Pu	POMPA PUMP
Rin	INGRESSO ACQUA RECUPERO RECOVERY WATER INLET
Rout	USCITA ACQUA RECUPERO RECOVERY WATER OUTLET
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
St	SERBATOIO DI ACCUMULO STORAGE TANK

Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET
Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET
▨	SPAZI DI INSTALLAZIONE CLEARANCES

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002 - ZETA 2002/HP - FOOTPRINT - MODELS 14.4 - 16.4

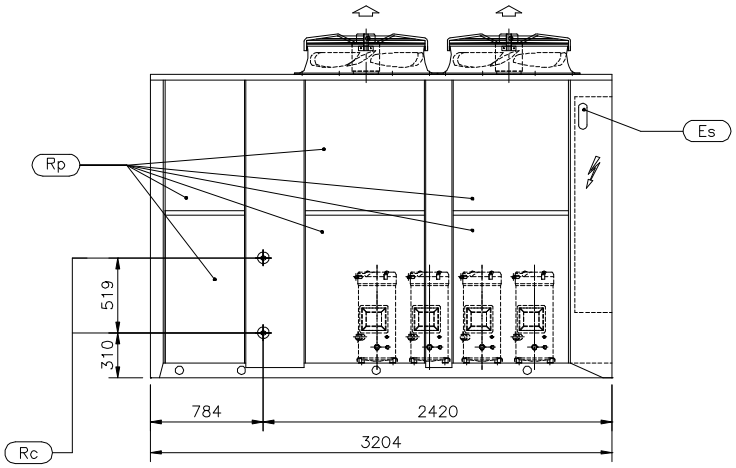


IMPRONTA A TERRA / FOOTPRINT

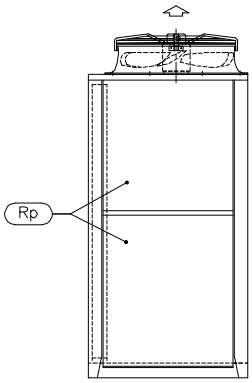
MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002 14.4	1400	1416	266	122	101	219
ZETA 2002 16.4	1464	1480	281	128	103	228
ZETA 2002/ST 1P-2P 14.4	1538	1564	267	161	133	221
ZETA 2002/ST 1P-2P 16.4	1594	1622	281	167	135	228
ZETA 2002/ST 1PS-2PS-S 14.4	1642	2048	247	317	258	202
ZETA 2002/ST 1PS-2PS-S 16.4	1678	2086	260	319	256	208
ZETA 2002/DS 14.4	1487	1506	276	134	112	231
ZETA 2002/DS 16.4	1546	1564	290	140	115	237
ZETA 2002/DS/ST 1P-2P 14.4	1597	1626	272	171	143	227
ZETA 2002/DS/ST 1P-2P 16.4	1656	1684	286	178	145	233
ZETA 2002/DS/ST 1PS-2PS-S 14.4	1639	1666	280	173	145	235
ZETA 2002/DS/ST 1PS-2PS-S 16.4	1762	2172	270	331	267	218
ZETA 2002/HP 14.4	1481	1498	273	130	112	234
ZETA 2002/HP 16.4	1537	1554	290	132	111	244
ZETA 2002/HP/ST 1P-2P 14.4	1591	1616	272	164	140	232
ZETA 2002/HP/ST 1P-2P 16.4	1647	1674	286	170	142	239
ZETA 2002/HP/ST 1PS-2PS-S 14.4	1697	2102	258	315	263	215
ZETA 2002/HP/ST 1PS-2PS-S 16.4	1753	2160	271	322	264	223
ZETA 2002/HP/DS 14.4	1529	1546	280	139	118	236
ZETA 2002/HP/DS 16.4	1585	1606	298	142	117	246
ZETA 2002/HP/DS/ST 1P-2P 14.4	1639	1666	280	173	145	235
ZETA 2002/HP/DS/ST 1P-2P 16.4	1695	1724	294	179	147	242
ZETA 2002/HP/DS/ST 1PS-2PS-S 14.4	1745	2154	265	326	268	218
ZETA 2002/HP/DS/ST 1PS-2PS-S 16.4	1801	2210	278	332	269	226

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

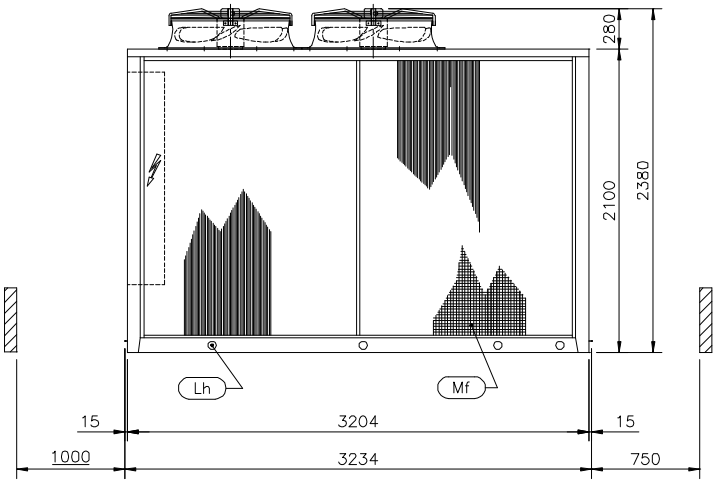
ZETA 2002/LE - ZETA 2002 /LE/HP - MODELS 14.4 - 16.4

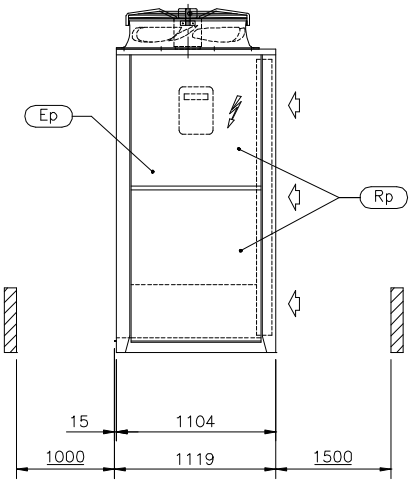


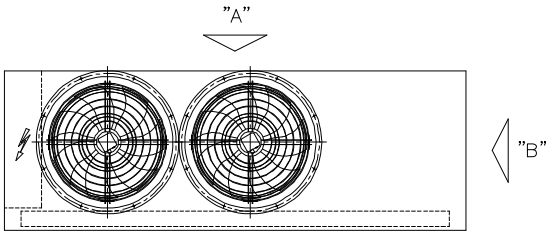
VISTA DA "A"
VIEW FROM "A"



VISTA DA "B"
VIEW FROM "B"



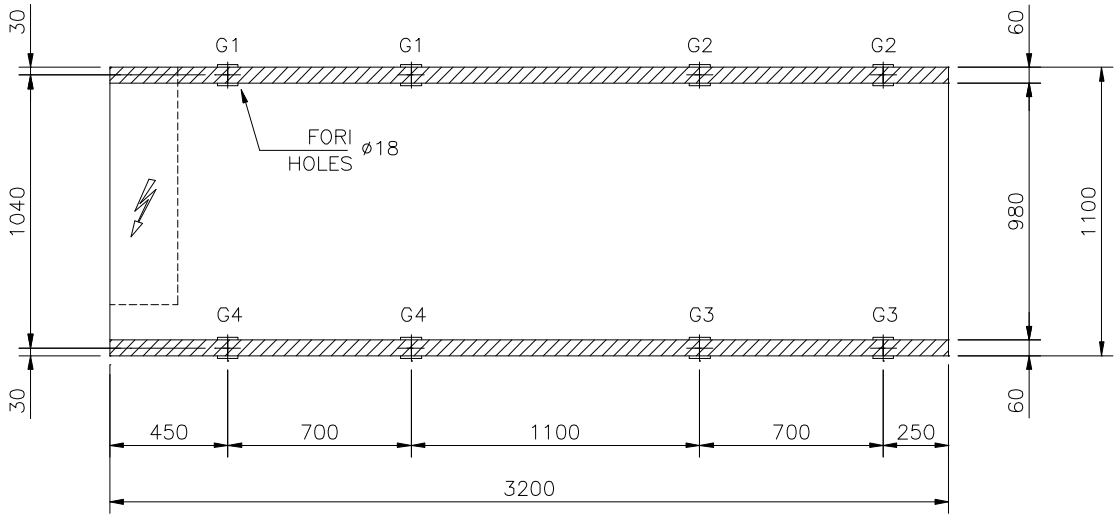




⇩	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW	Lh	FORI DI SOLLEVAMENTO LIFTING HOLES	Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
Ep	QUADRO ELETTRICO ELECTRICAL PANEL	Mf	FILTRI METALLICI METALLIC FILTER	▨	SPAZI DI INSTALLAZIONE CLEARANCES
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET	Rc	CONNESSIONI REFRIGERANTE REFRIGERANT CONNECTIONS		

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002/LE - ZETA 2002 /LE/HP - FOOTPRINT - MODELS 18.4 - 26.4

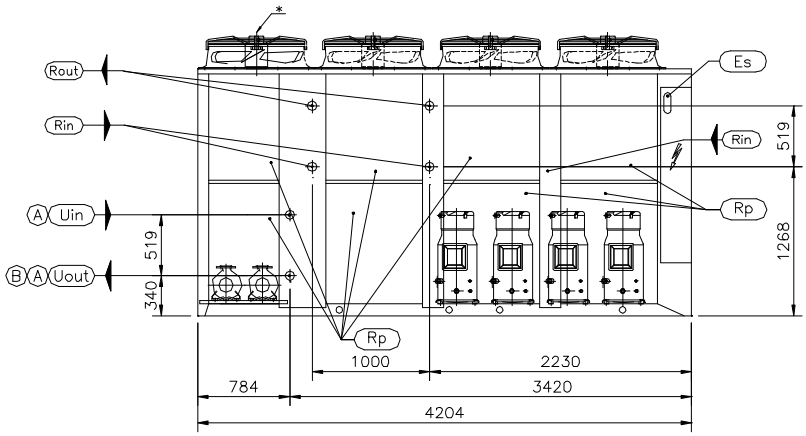


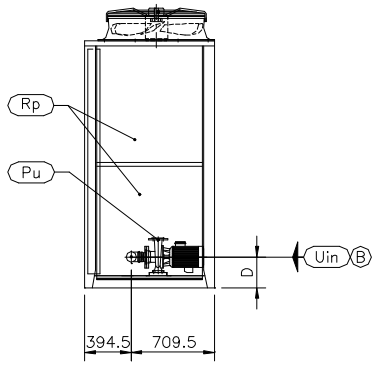
IMPRONTA A TERRA / FOOTPRINT

MODELLO MODEL	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002/LE 14.4	1298	246	104	89	210
ZETA 2002/LE 16.4	1346	259	107	90	217
ZETA 2002/LE/HP 14.4	1374	254	110	97	226
ZETA 2002/LE/HP 16.4	1420	267	113	98	232

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

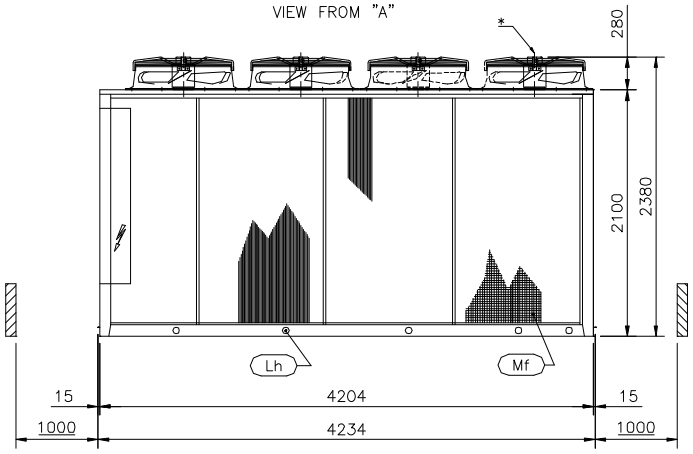
ZETA 2002 - ZETA 2002/HP - MODELS 18.4 - 26.4

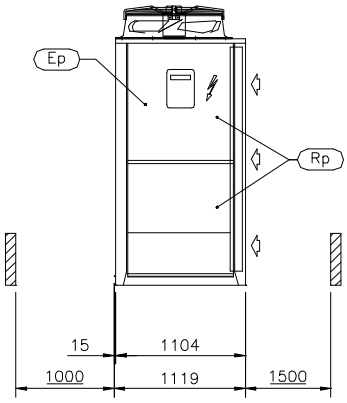


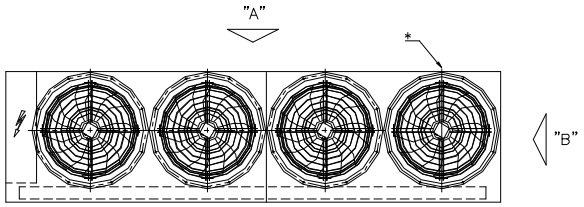


VISTA DA "B"
VIEW FROM "B"

VISTA DA "A"
VIEW FROM "A"







Ⓐ SENZA MODULO IDRAULICO
WITHOUT HYDRAULIC MODULE

Ⓑ MODULO IDRAULICO ST1P–ST2P
HYDRAULIC MODULE ST1P–ST2P

UNITA'	D	Uin		Uout	Rin	Uout
		Ⓐ	Ⓑ			
18.4–20.4	262	G 3"F	G 2 1/2"F	G 3"F	G 2"M	G 2"M
24.4–26.4	290	G 3"F	G 2 1/2"F	G 3"F	G 2"M	G 2"M

* PRESENTE SOLO NEI MODELLI 24.4–26.4

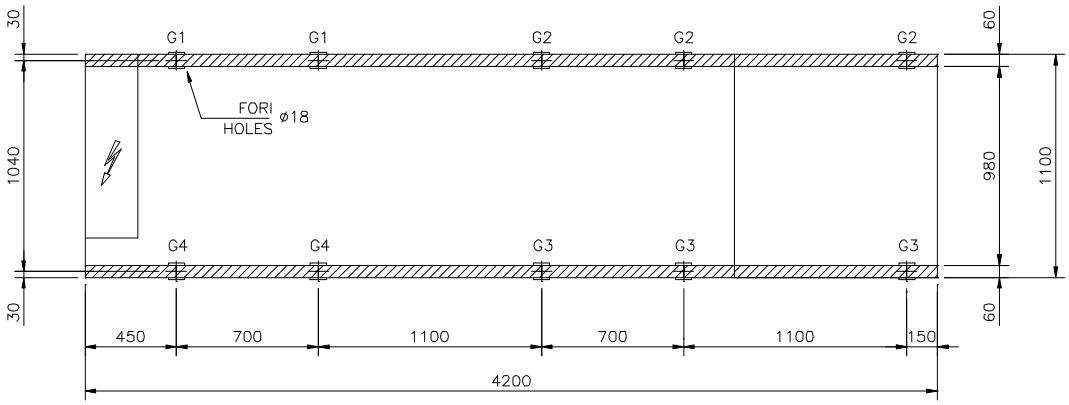
⇩	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES
Mf	FILTRI METALLICI METALLIC FILTER

Pu	POMPA PUMP
Rin	INGRESSO ACQUA RECUPERO RECOVERY WATER INLET
Rout	USCITA ACQUA RECUPERO RECOVERY WATER OUTLET
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET

Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET
▨	SPAZI DI INSTALLAZIONE CLEARANCES

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002 - ZETA 2002/HP - FOOTPRINT - MODELS 18.4 - 26.4

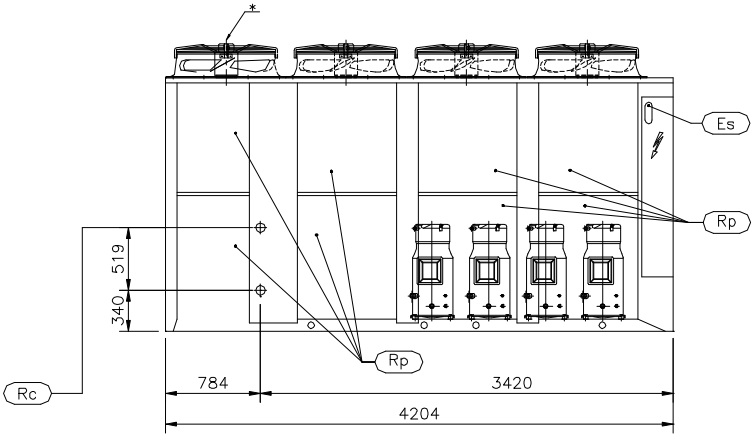


IMPRONTA A TERRA / FOOTPRINT

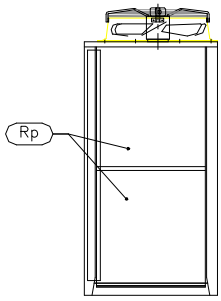
MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002 18.4	1930	1950	339	143	109	258
ZETA 2002 20.4	2089	2108	378	155	113	274
ZETA 2002 24.4	2208	2229	390	175	124	276
ZETA 2002 26.4	2349	2376	411	184	134	300
ZETA 2002/ST 1P-2P 18.4	2080	2126	322	187	143	246
ZETA 2002/ST 1P-2P 20.4	2259	2308	365	201	147	267
ZETA 2002/ST 1P-2P 24.4	2388	2435	378	221	158	271
ZETA 2002/ST 1P-2P 26.4	2569	2623	395	240	177	291
ZETA 2002/DS 18.4	2031	2061	349	163	120	257
ZETA 2002/DS 20.4	2190	2221	389	176	123	273
ZETA 2002/DS 24.4	2309	2342	400	195	135	276
ZETA 2002/DS 26.4	2459	2498	423	206	146	298
ZETA 2002/DS/ST 1P-2P 18.4	2181	2234	332	207	153	245
ZETA 2002/DS/ST 1P-2P 20.4	2370	2424	377	221	157	268
ZETA 2002/DS/ST 1P-2P 24.4	2489	2548	388	241	169	271
ZETA 2002/DS/ST 1P-2P 26.4	2679	2745	406	263	188	290
ZETA 2002/HP 18.4	2007	2029	345	152	117	266
ZETA 2002/HP 20.4	2181	2202	389	164	120	286
ZETA 2002/HP 24.4	2300	2324	400	184	132	288
ZETA 2002/HP 26.4	2441	2466	421	192	142	311
ZETA 2002/HP/ST 1P-2P 18.4	2157	2194	330	193	149	254
ZETA 2002/HP/ST 1P-2P 20.4	2311	2357	367	208	153	270
ZETA 2002/HP/ST 1P-2P 24.4	2430	2478	378	228	164	273
ZETA 2002/HP/ST 1P-2P 26.4	2430	2478	378	228	164	273
ZETA 2002/HP/DS 18.4	2056	2088	353	164	122	262
ZETA 2002/HP/DS 20.4	2230	2261	397	176	125	282
ZETA 2002/HP/DS 24.4	2329	2364	404	196	136	280
ZETA 2002/HP/DS 26.4	2479	2514	426	206	146	303
ZETA 2002/HP/DS/ST 1P-2P 18.4	2206	2253	337	206	153	251
ZETA 2002/HP/DS/ST 1P-2P 20.4	2360	2418	375	221	157	267
ZETA 2002/HP/DS/ST 1P-2P 24.4	2479	2537	385	241	168	270
ZETA 2002/HP/DS/ST 1P-2P 26.4	2669	2739	404	263	188	289

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

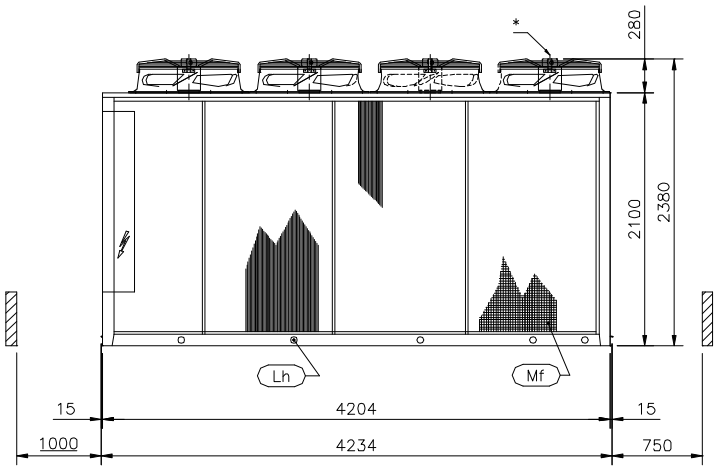
ZETA 2002/LE - ZETA 2002/LE/HP - MODELS 18.4 - 26.4

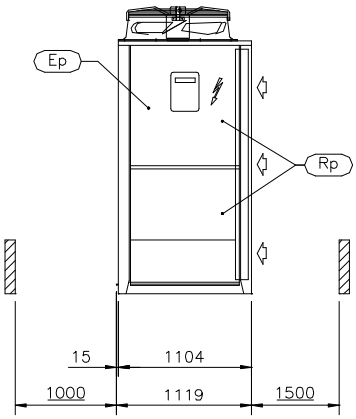


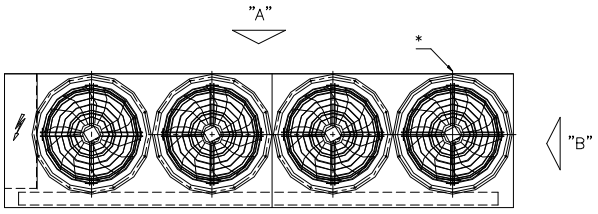
VISTA DA "A"
VIEW FROM "A"



VISTA DA "B"
VIEW FROM "B"





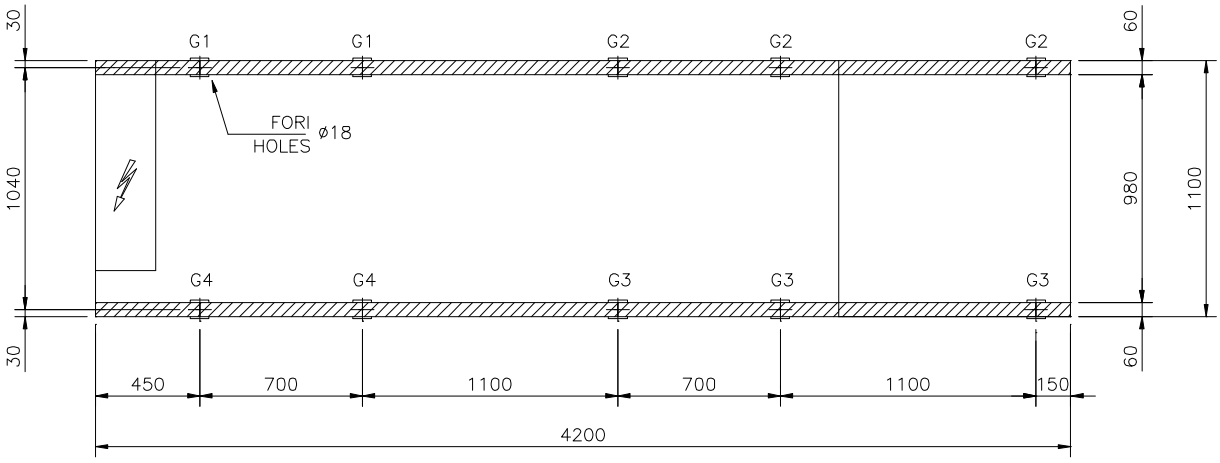


* PRESENTE SOLO NEI MODELLI 24.4–26.4

⇩	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW	Lh	FORI DI SOLLEVAMENTO LIFTING HOLES	Rc	CONNESSIONI REFRIGERANTE REFRIGERANT CONNECTIONS
Ep	QUADRO ELETTRICO ELECTRICAL PANEL	Mf	FILTRI METALLICI METALLIC FILTER	▨	SPAZI DI INSTALLAZIONE CLEARANCES
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET	Rp	PANNELLO ASPORTABILE REMOVABLE PANEL		

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002/LE - ZETA 2002/LE/HP - FOOTPRINT - MODELS 18.4 - 26.4

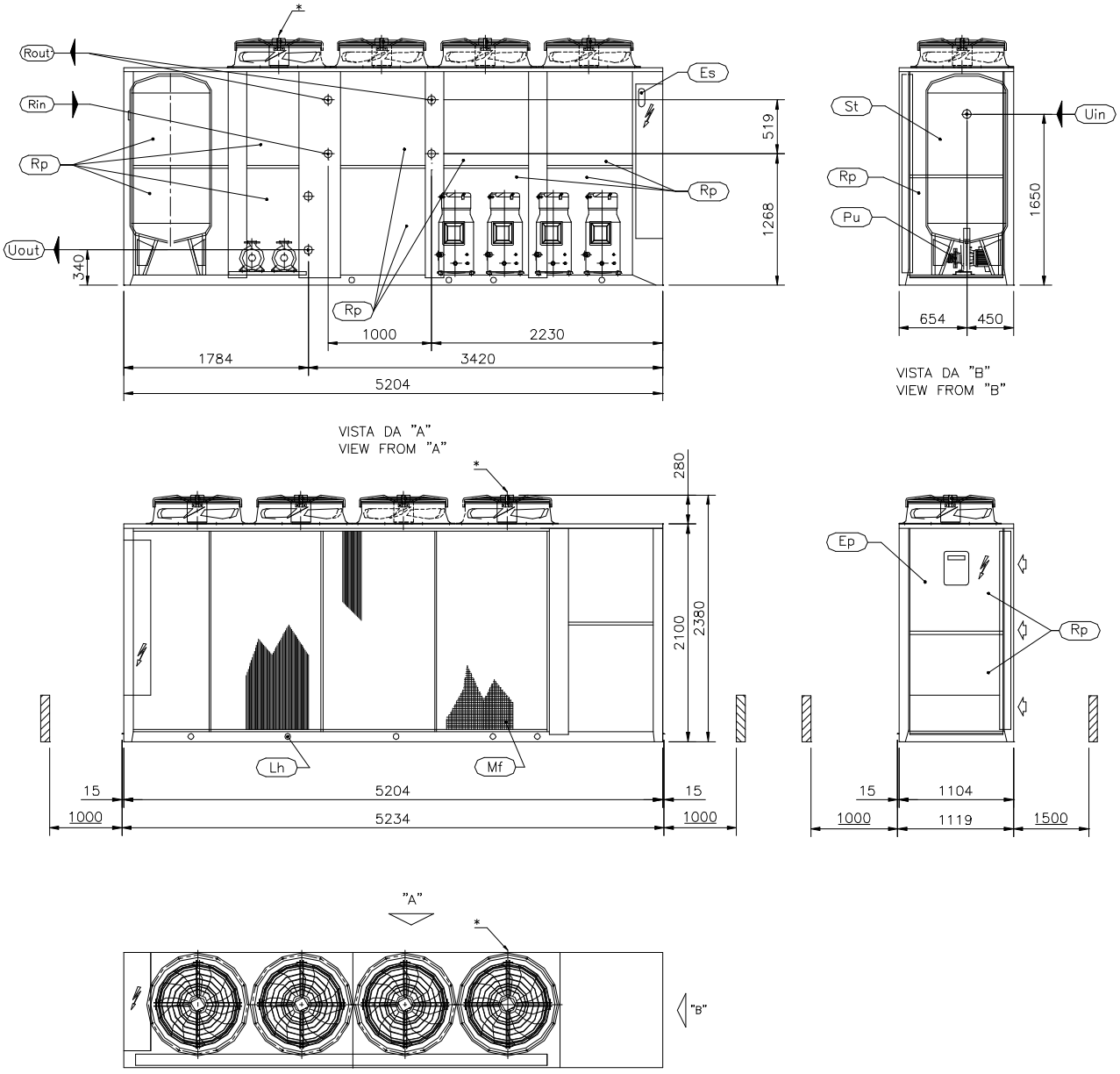


IMPRONTA A TERRA / FOOTPRINT

MODELLO MODEL	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002/LE 18.4	1932	331	126	108	284
ZETA 2002/LE 20.4	2090	371	138	112	299
ZETA 2002/LE 24.4	2199	383	155	122	301
ZETA 2002/LE 26.4	2301	404	159	126	319
ZETA 2002/LE/HP 18.4	2019	336	135	118	294
ZETA 2002/LE/HP 20.4	2196	379	148	122	314
ZETA 2002/LE/HP 24.4	2308	391	165	133	316
ZETA 2002/LE/HP 26.4	2410	412	169	137	334

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002/ST - ZETA 2002/HP/ST - MODELS 18.4 - 26.4



* PRESENTE SOLO NEI MODELLI 24.4–26.4

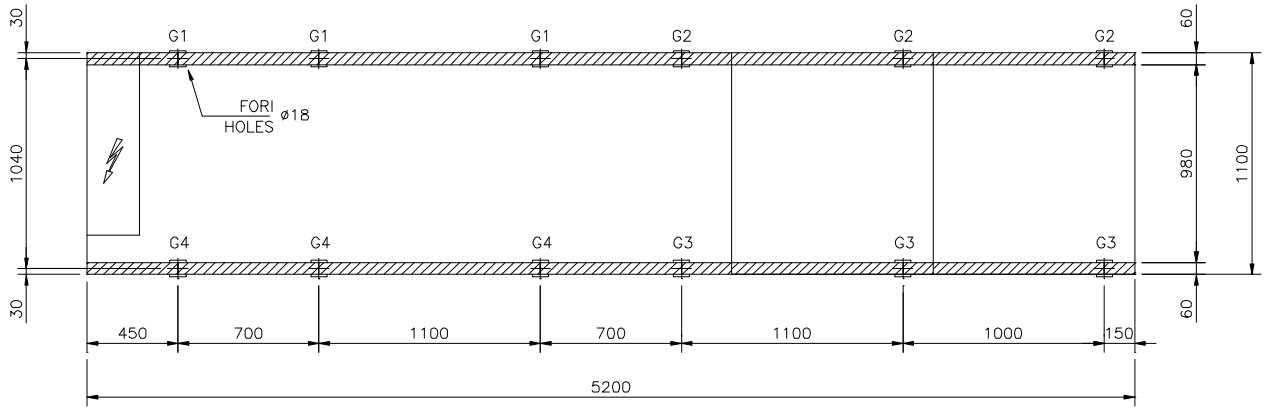
⇩	FLUSSO ARIA CONDENSAZIONE CONDENSING AIR FLOW
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES
Mf	FILTRI METALLICI METALLIC FILTER

Rout	USCITA ACQUA RECUPERO RECOVERY WATER OUTLET	G 2"M
Rin	INGRESSO ACQUA RECUPERO RECOVERY WATER INLET	G 2"M
Pu	POMPA PUMP	
Rp	PANNELLO ASPORTABILE REMOVABLE PANEL	
St	SERBATOIO DI ACCUMULO STORAGE TANK	

Uin	INGRESSO ACQUA UTILIZZO USER WATER INLET	G 3"F
Uout	USCITA ACQUA UTILIZZO USER WATER OUTLET	G 3"F
▨	SPAZI DI INSTALLAZIONE CLEARANCES	

OVERALL DIMENSIONS, WEIGHTS AND HYDRAULIC CONNECTIONS

ZETA 2002/ST - ZETA 2002/HP/ST - FOOTPRINT - MODELS 18.4 - 26.4



IMPRONTA A TERRA / FOOTPRINT

MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	PESO IN FUNZIONE(Kg) OPERATING WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)
ZETA 2002/ST 1PS-2PS-S 18.4	2290	3036	273	305	229	205
ZETA 2002/ST 1PS-2PS-S 20.4	2449	3192	305	311	226	222
ZETA 2002/ST 1PS-2PS-S 24.4	2622	3372	323	323	239	239
ZETA 2002/ST 1PS-2PS-S 26.4	2749	3504	341	333	244	250
ZETA 2002/HP/ST 1PS-2PS-S 18.4	2387	3123	282	314	234	211
ZETA 2002/HP/ST 1PS-2PS-S 20.4	2566	3303	318	320	232	231
ZETA 2002/HP/ST 1PS-2PS-S 24.4	2739	3480	336	332	245	247
ZETA 2002/HP/ST/1PS-2PS-S 26.4	2866	3606	352	344	250	256
ZETA 2002/DS/ST 1PS-2PS-S 18.4	2391	3147	286	319	234	210
ZETA 2002/DS/ST 1PS-2PS-S 20.4	2550	3309	319	325	232	227
ZETA 2002/DS/ST 1PS-2PS-S 24.4	2723	3483	336	337	244	244
ZETA 2002/DS/ST 1PS-2PS-S 26.4	2859	3624	356	349	249	254
ZETA 2002/HP/DS/ST 1PS-2PS-S 18.4	2436	3183	290	324	236	211
ZETA 2002/HP/DS/ST 1PS-2PS-S 20.4	2615	3363	327	330	233	231
ZETA 2002/HP/DS/ST 1PS-2PS-S 24.4	2788	3537	344	341	246	248
ZETA 2002/HP/DS/ST/1PS-2PS-S 26.4	2924	3678	362	355	252	257

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